Circulair

Concealed Radiation

CIRCULAIR HEAT CO.
Incorporated
LOUISVILLE, KY.

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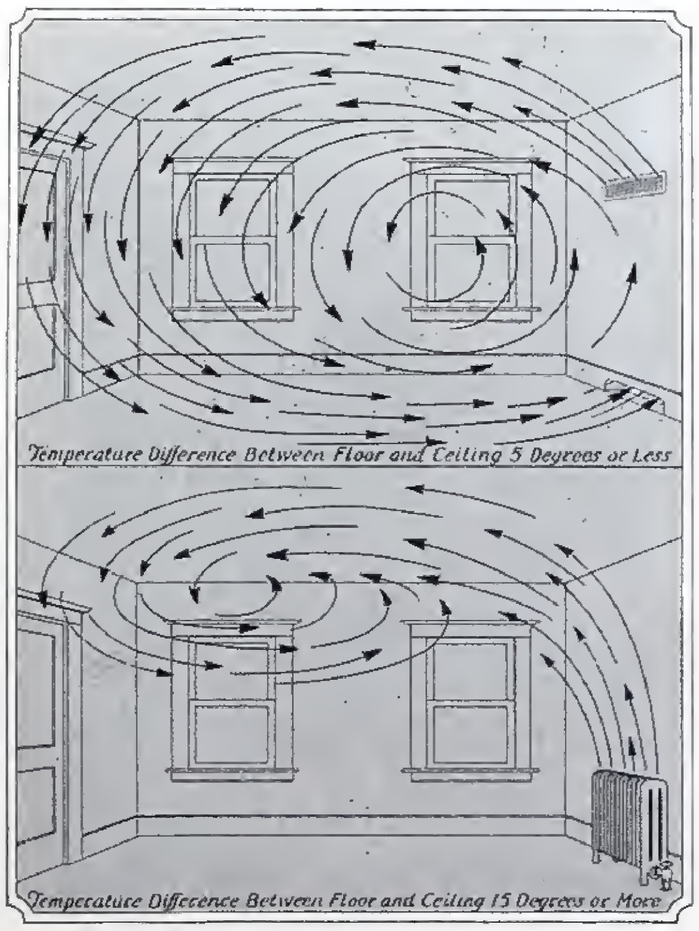
PROGRESS demands better homes, better schools, better churches, better office buildings, and in fact more substantial, more efficient and more artistic construction of every kind. All recognized authorities agree that neither beauty, utility or efficiency should be sacrificed one for the other.

Circulair Concealed Convection Heaters were designed to meet this demand of Progress. Concealed in the thickness of the wall between the studding—under windows or in side walls—only a long narrow opening in the baseboard, and a neat decorative grille in the wall above, indicates the presence of Circulair Heat, lending harmony to the surroundings, convenience to the occupants, and efficient and uniform distribution of the heat.

In this, the tenth booklet published on Circulair Heaters, we have so arranged the pictures, engineering data, and tables, as to permit the layman to quickly grasp the underlying principles of this comparatively new, but completely accepted, method of unobtrusive heating. At the same time complete mechanical details are provided, in as logical a fashion as possible, for the use of the engineer, architect and contractor.

A perusal of this booklet will convince these varied interests of the superiority of Circulair Heat as a heating medium and the simplicity of its installation.

Circulair Heat, by projecting the heated air out into the room, minimizes the discoloration of walls and ceilings, and soiling of drapes and hangings.



Circulair Heat insures uniform distribution—the positive circulation of heated air does away entirely with that unpleasant "close" feeling, and achieves uniform comfortable warmth with a temperature difference of 5° F. or less between ceiling and floor.

Harmony with Circulair

THE QUIET dignity of such a room as pictured above demanded careful consideration by its designer of decorative details. This beautiful study is heated by Circulair—quietly, efficiently, and unobtrusively.

The mechanical product is there—but no more in evidence than is the pump which makes possible the voice of the cathedral organ.

Not alone in homes, but equally as harmoniously in such exclusive period projects as the Deer Creek Club seen on the opposite page, is Circulair saving space, enhancing architectural treatment, and bringing an entirely new conception of heating efficiency.

Guarantee

CIRCULAIR Heat Company, Inc., of Louisville, Ky., guarantees that Circulair Concealed heaters and Circulair cabinet heaters will deliver their rated capacities as published, when the heaters are installed, and the system operated in accordance with instructions, and further guarantees all Circulair Heat Company's products to be free from mechanical defects in workmanship or material.

Circulair Heat Company's Heating Element is guaranteed against leaks for the life of the original installation, and if it should develop at any time that a leak occurs in any Circulair Heating Element which has been properly installed, and not improperly used or abused, same will be replaced at the expense of the Circulair Heat Company.

In the Living Room

CIRCULAIR Concealed Heaters are time-tried and dependable. They are today an accepted need of good house-planning.

A few years ago Concealed Heating was only a desire, expressed by good architects and careful home builders. Today nearly every magazine devoted to home building interests carries articles by prominent architects, and other recognized authorities, extolling the virtues of "Concealed Heating." Circulair has truly filled a modern need.

In the Hall

THE LOCATION of Circulair Concealed Heaters should be as dictated by good engineering practice, preferably at the point of greatest exposure, which will generally be under a window. In hallways and corridors, it is usually necessary to locate the heater in the side wall as pictured at the left. The grille may be located at any height from 20″ to 80″, above the floor, with assured efficiency at all heights.

In the Dining Room

PROPER and healthful air circulation, maximum heating efficiency, freedom in decoration, and harmony with architectural design are combined in Circulair where other methods of heating would prove difficult.

Instant Heat Control

CONTROL of Heat with Circulair damper is so easy that it is almost automatic. A flick of the finger in passing, opens or closes the damper and completely and instantly starts or stops the flow of heat from the grille.

When the damper is closed, condensation of steam is instantly reduced to almost the same extent as would obtain by closing a valve in the steam supply line to the heater.

The moment the damper is opened, circulation of air over the copper fins immediately brings the condensation of steam in the oval copper tube up to 100%, or rating value of the unit. In bedrooms and bathrooms this condition is especially desirable. The heat in Circulair heaters is like water in a reservoir—obtainable instantly.

Economy of Space

TWO EXAMPLES of the adaptability of Circulair Heat are pictured here. Space in every breakfast nook is at a premium. Every square foot of floor space is available for use, with Circulair Heat concealed within the wall.

Equally useful is the space saving feature of the Circulair installation in the Eastman Kodak Store shown below. A slot through the wall case for intake of air at the floor, and a grille in the wall above the top of the wall case are the only visible evidences of the medium by which this, and many other such modern stores, are comfortably and uniformly heated.

The Complete Unit

HERE is pictured and diagramed the complete Circulair "Plastered In" Unit, as it leaves the factory. This is a *complete* unit, every part made in our own plant, and completely assembled. The three essential parts as outlined below are: 1—The heater only, consisting of the element and its casing; 2—The outlet assembly, including the boot with its damper, damper control and grille, and 3—The duct or stack by means of which the overall height is varied. When no duct is used, the overall height is the minimum of 20". Introduction of factory built ducts permits of various overall heights from 25" to 80", and since these ducts are made to order, any height between the limits mentioned may be had.

Note the wires on the front of the boot directly below the grille. These are to be used to fasten the expanded metal lath to the front of the heater, as is also the purpose of the small angles riveted to the duct. Stiffeners are used inside the duct. These serve a double purpose as they reinforce the duct, and insure an even distribution of the warmed air throughout the entire duct area, and through the grille.

Note. This is a ⅛" to 1" scale drawing of a 24" #6-40" high Unit

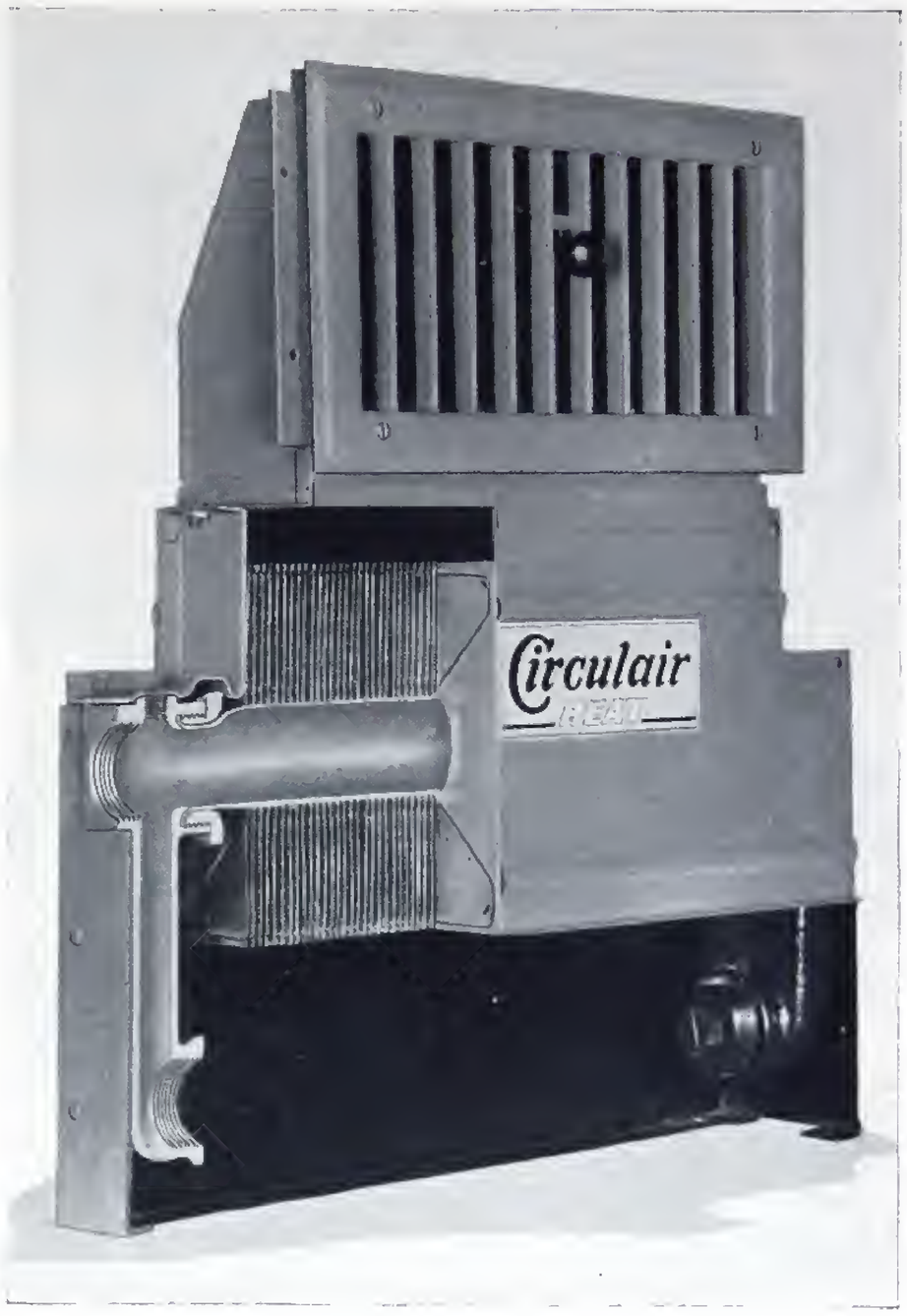
Leakproof Construction

THIS sectional view shows in intimate detail the Circulair heating element itself.

The method used to join the tube to the steam header is unique, and is the basis of Circulair Heat Company's ability to make the life-long leak-proof guarantee printed on page 3 of this catalog. This joint is so perfect that it makes the bronze steam header one piece with the copper tubing. This is accomplished by first forming both ends of the oval tube so that they become perfectly round. Over these round ends are slipped the cast brass jamb nuts, and the ends of the tubing are spun on to the jamb nuts in a special spinning machine designed solely for that purpose.

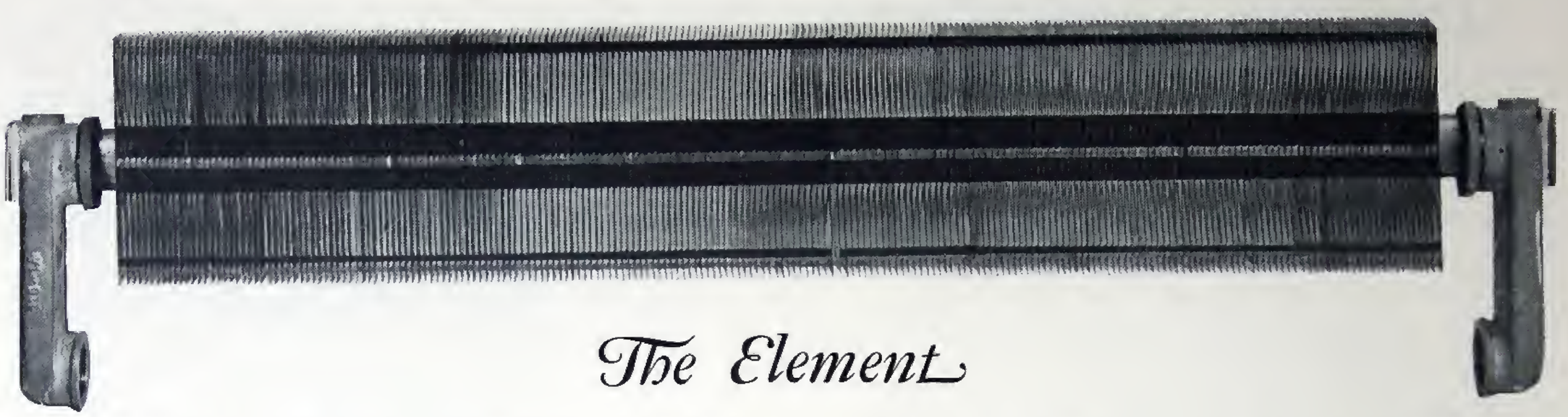
The bronze header is then screwed tightly to the jamb nut, thus forming a perfect Van Stone joint.

Take particular note of the double connection header. This construction makes it possible to connect to supply and return lines, either at the ends or underneath inside. This illustration shows the complete heater without duct, giving an overall minimum height of 20″, as mentioned on preceding page.



The Four Standard Types

HERE are the four standard types of Circulair Heaters. Reading from left to right, they are the No. 16, No. 8, No. 6, and No. 4. All, except the No. 16, are of such widths as to fit between standard studding. For illustration, the No. 4 size is 3⅜″ wide, to permit of its being installed between 2 x 4 studding. The No. 16 unit is 15″ wide, and may be installed under a window seat, or built into a furred space, or in a recess in walls thick enough to permit. With nine lengths, and eight catalogued heights for each type, a total of 288 standard ratings is obtained, from which a Circulair heater of the proper size and shape for any given condition may be selected. This illustration shows the heater only, consisting of the element and its casing.



The Element

CIRCULAIR HEATING ELEMENT is a product of scientific research. The size of the copper tube, and the shape and size of the copper fins, and the most efficient relation between the areas of tube and fins, were determined only after hundreds of tests were made in the Frost Research Laboratories at Norristown, Pa., and at the plant of the Carrier Engineering Corporation.

The phosphor copper tube is oval shape, being 1-25/32"x15/16" outside measurement, or 4½" around. The copper fins, although of different shape for the No. 4, 6 and 8 heaters, are all the same area—namely, 22.8 sq. in. Since there are 72 fins per foot of tube length, or a total fin area of 1641.6 sq. in. and since one foot of tubing has an outside area of 54 sq. in., the relation of tube (or prime surface) to fin (or extended surface) is 1 to 30 (approximately). This has been determined as the proper relation.

The fins are stiffened by carefully designed beading, and at each corner and at the center of the long side, a triangular shaped spacer is pushed out at right angles insuring uniform spacing and fixed, rigid interlocking of the fins: When the oval hole is stamped in the center of the fin, a collar is set out for proper spacing, and to provide an additional area of contact between fin and tube.

The fins are forced onto the tube in intimate contact with the surface of the tube, and is exceedingly effective, but not as effective as if the extended and prime surfaces were metallically integral. Flow of heat is retarded by an imperfect contact in just the same way as flow of electricity is retarded at a juncture where the ends of wires are twisted, but not soldered. So, after the fins have been pressed on the tube, and the bronze headers secured to the ends of the tube, the entire element is dipped in molten tin alloy, thereby making the extended surface actually metallically integral with the tube surface.

Not only does this tinning guarantee perfect heat conductivity as no mere mechanical contact can possibly do, but it assures also the *permanency* of this high conductivity, insuring against that decreasing efficiency in service to which the unit would be subject were it left as an aggregation of surfaces in mere mechanical contact. The tinning also produces a surface which never corrodes, nor gathers verdigris, the "green rust" of copper, and is so smooth that it is difficult for dirt or dust to find a lodging. An additional function is performed by the dipping process in that the molten metal runs into four small holes drilled through the bronze casting to the threaded joint between the bronze lock nut and the end casting, thus providing additional insurance against leaks by actually tinning the threads together.

The Damper Control

AFTER having tried out various methods of damper control, Circulair Heat Company finally decided on the present bar and knob arrangement. A touch of the finger allows the slot in the bar to disengage the catch, and the damper drops down to tight closed position. Opening the damper is just as simple, and is performed by a slight push on the knob at the end of the rod.

This arrangement is simple and durable, and allows ready adjustment to any wall thickness. Extra length rods can be furnished for special conditions where the heater is set some distance back of the plaster or tile line.

Then, too, the rod control method can be applied to any grille used, whether that of the Circulair Heat Company's standard makes, or one of special design furnished by the General Contractor. This is not always possible when the damper control arrangement is made an integral part of the grille itself.

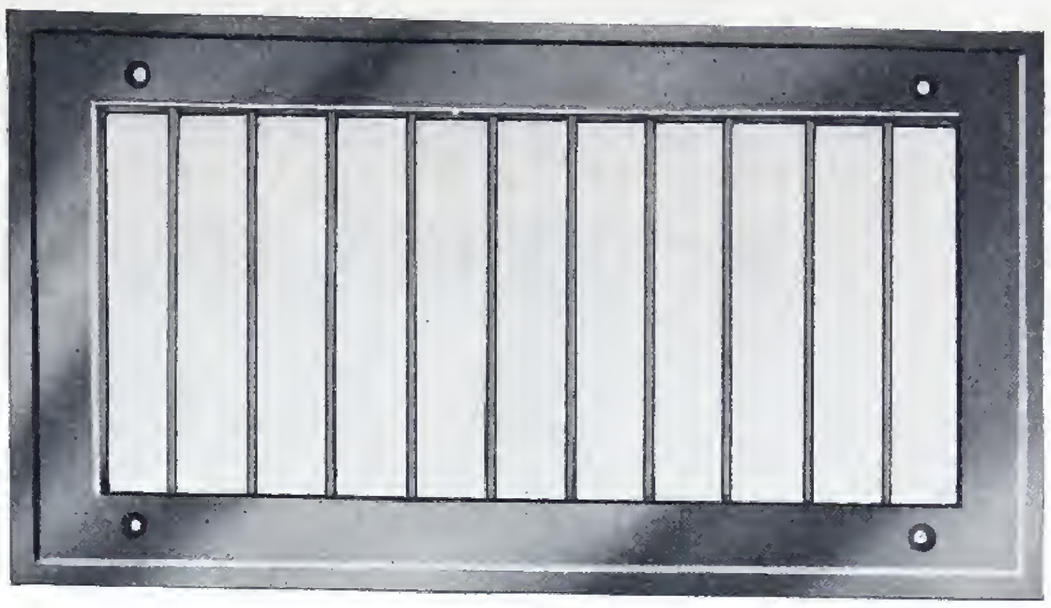
The Grilles

Standard Bar Type

The standard Bar Type Grille is plain, sturdy and pleasing in design, fitting in as it does with almost any architectural treatment, especially so with the straight line modernistic or the severe early American interiors.

The free area is exceptionally large, being 89% of the total face area.

The ½" x ⅛" steel bars are locked top and bottom into a 16 ga. furniture steel angle shaped frame. A smooth, unrestricted air flow is effected.



Reverse Side

The edges of the flange are shaped so that a very close fitting contact is made with the plaster finish, and this feature, together with the angle shape prevents air leakage, and the consequent unsightly dirt streaks on the plaster, so prevalent where the flat, stamped-out-sheet type of grille without frame is used.

Gothic

For more exacting design, where distinguished, ornamental grilles are required, the Gothic pattern (Style C) can be furnished at a slight added cost. The metal used is No. 14 gauge furniture steel, set into the same angle frame as in the bar type grille. It is usually furnished with a prime coat at the factory, ready to be finish painted on the job. This style is 72% open.

Grecian

The Grecian Design (Style Q) is another pleasing pattern furnished on special order. It meets the approval of discriminating architects and owners. This pattern is 65% open.

Either the Grecian, or the other grilles may be, if desired, finished in electroplated brass, bronze or copper instead of the usual prime coat for a paint finish. Additional cost for this special finish furnished on request.

Installat

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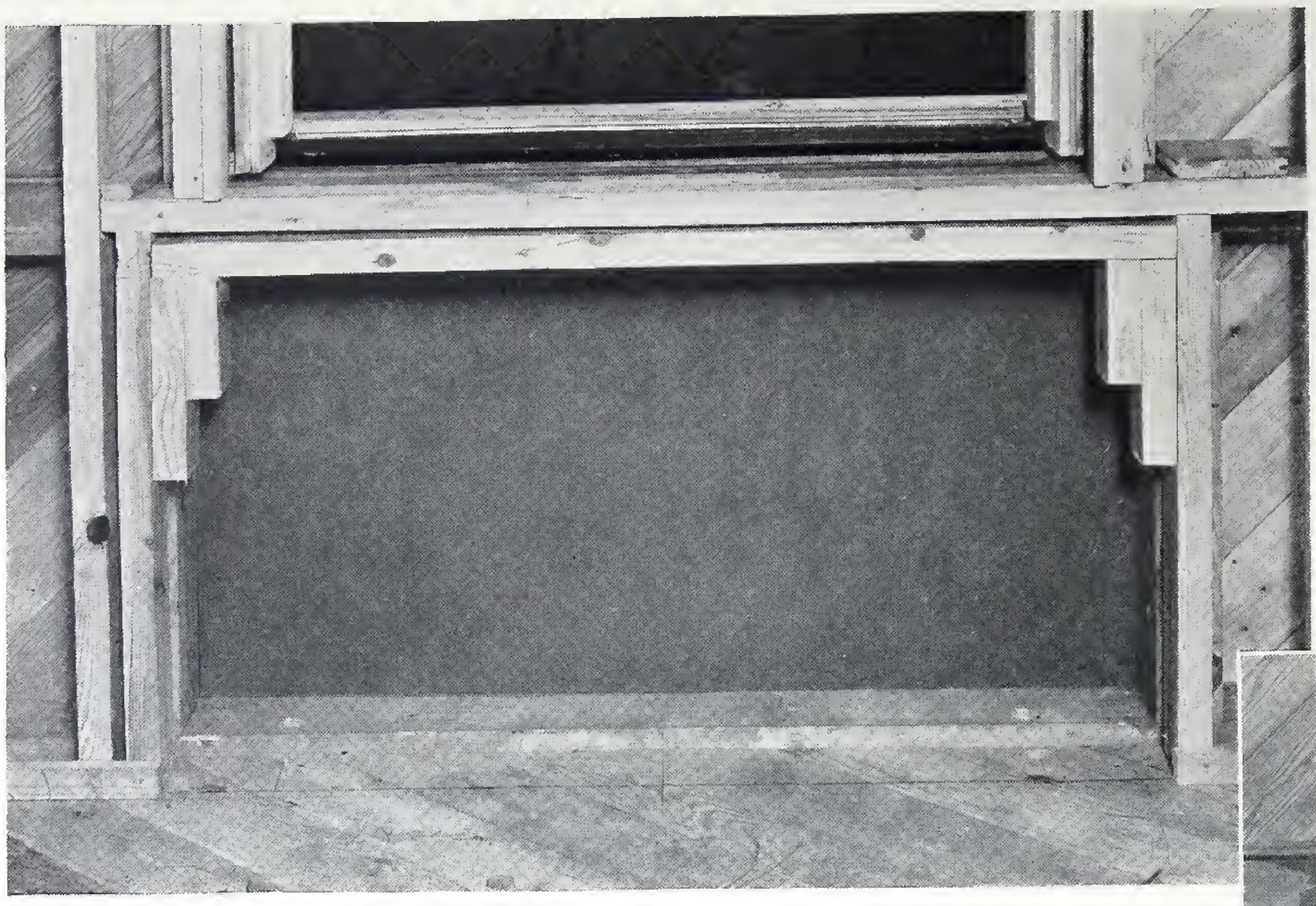

No. 1 The above picture shows very clearly and completely just how a typical under window recess should be prepared for the reception of the complete plastered-in type of Circulair Heating Unit. Note the insulating material nailed to the back of the recess. If the details for roughing-in these recesses, as shown on page 14, are carefully followed and all dimensions adhered to, the unit will fit perfectly and snugly in place.

No. 5 Below is seen an metal lath in pla contractor has n application of the grille and fas

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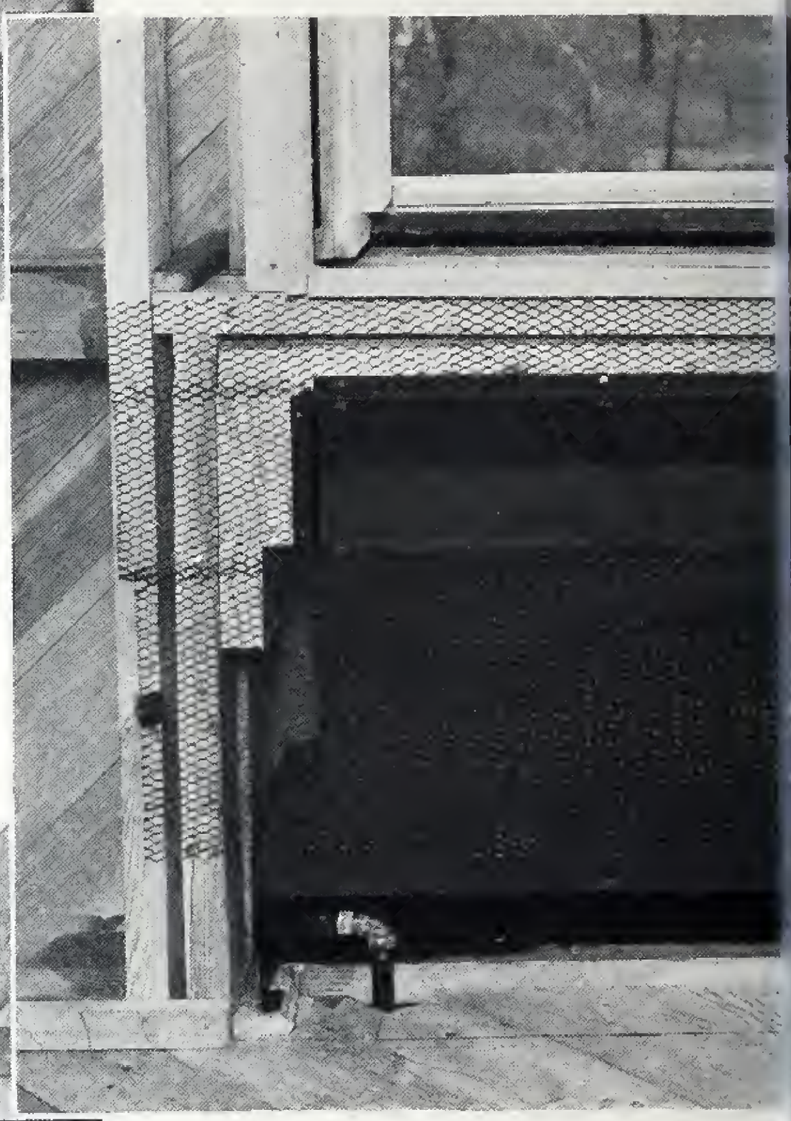

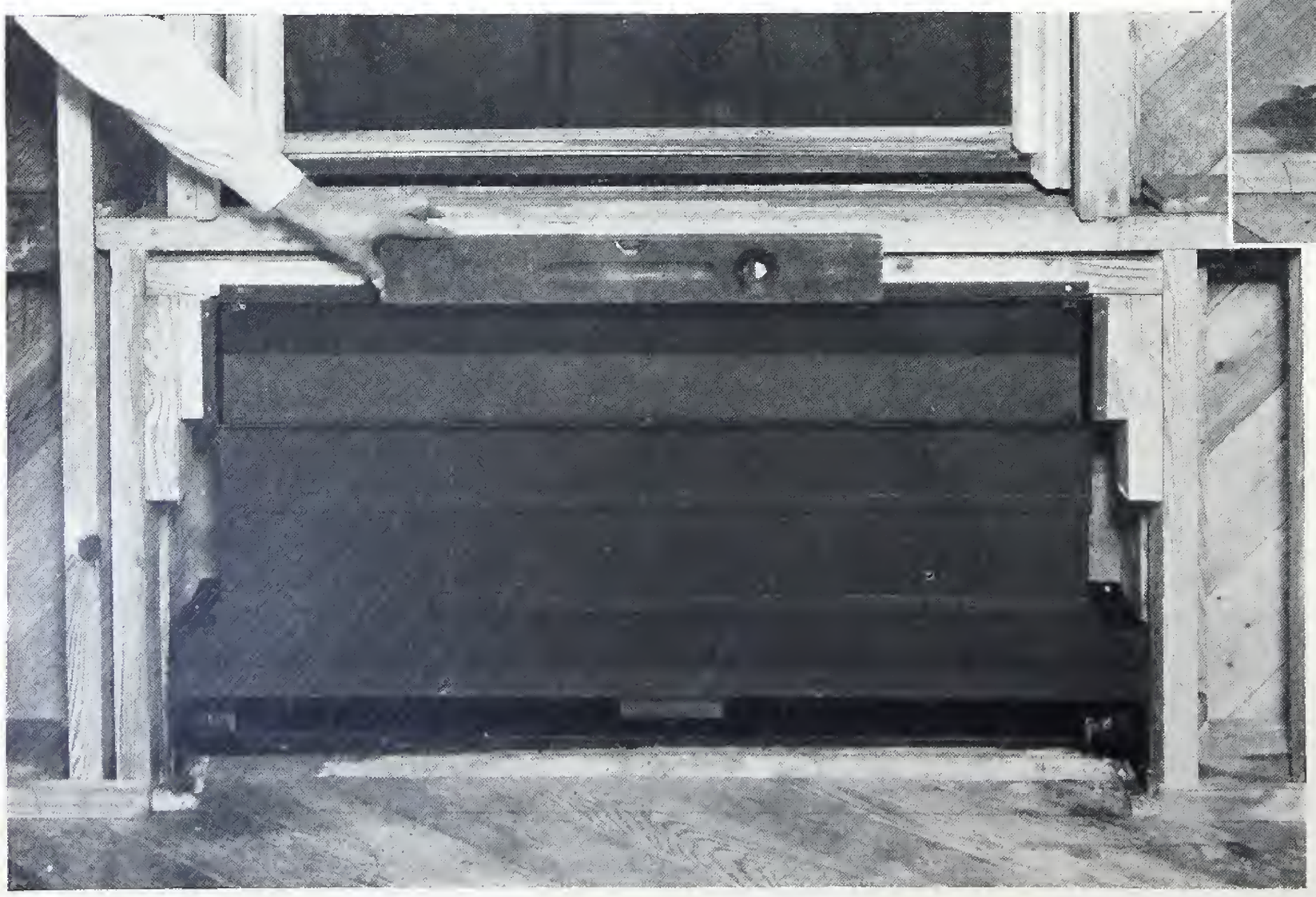

No. 3 In the picture to the left, the heater has been set in place in the recess and blocked up to the level of the finished flooring. These blocks are later removed, and the finished floor slipped underneath the heater. Care must be taken that the heater element is perfectly level or pitched only slightly toward the return end. The damper has been wired shut at the factory, and should be left so until the plastering is finished.

Details

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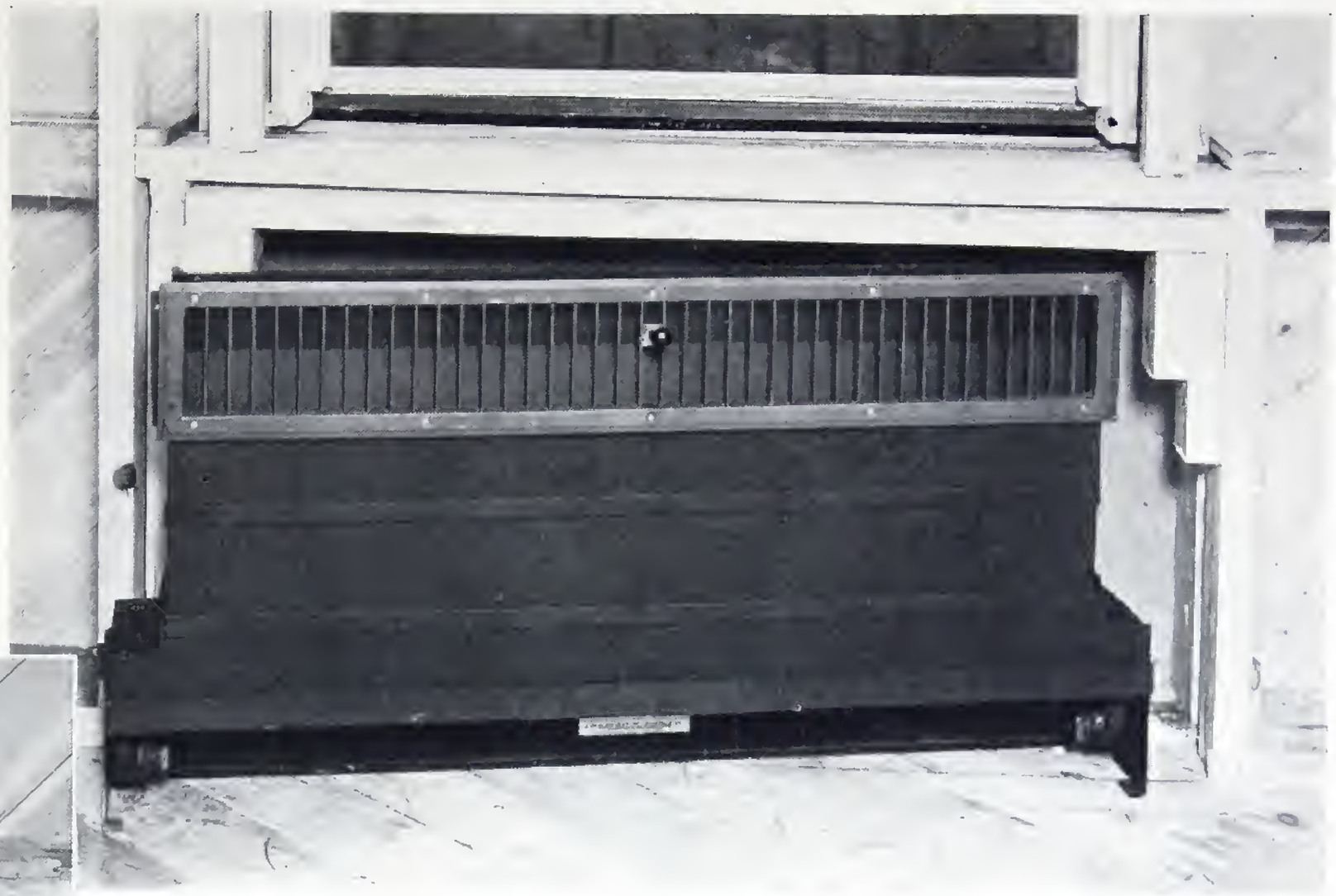
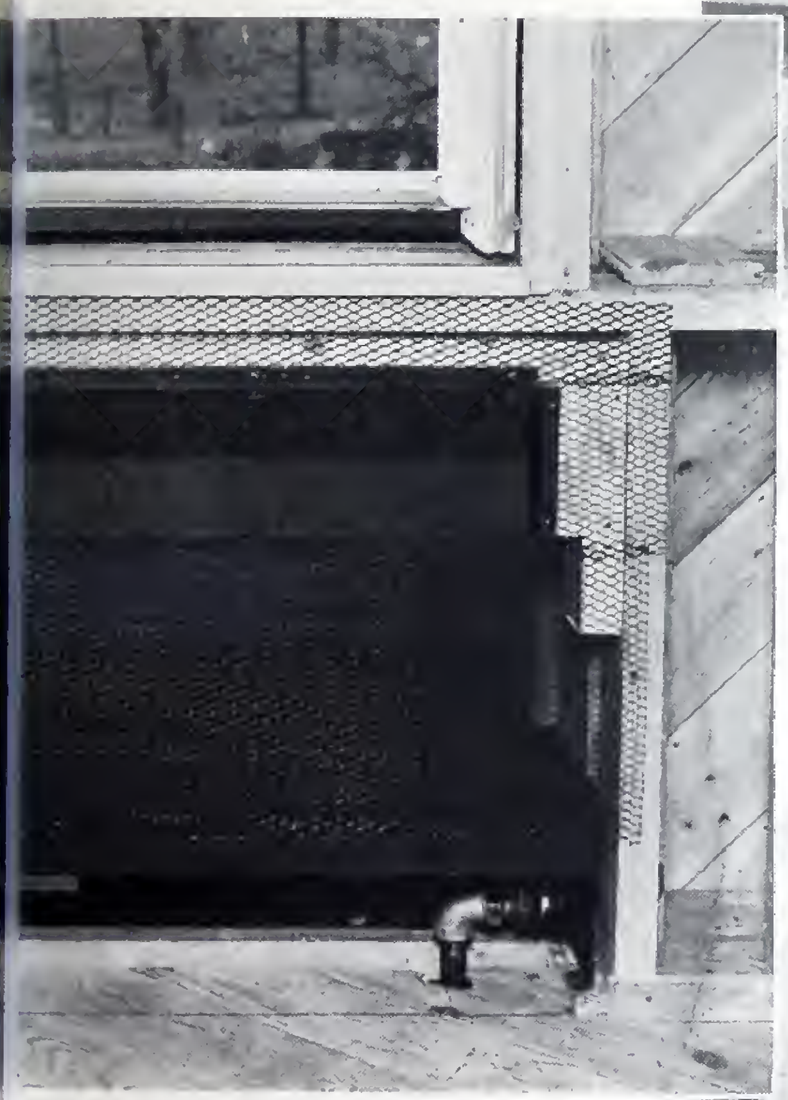
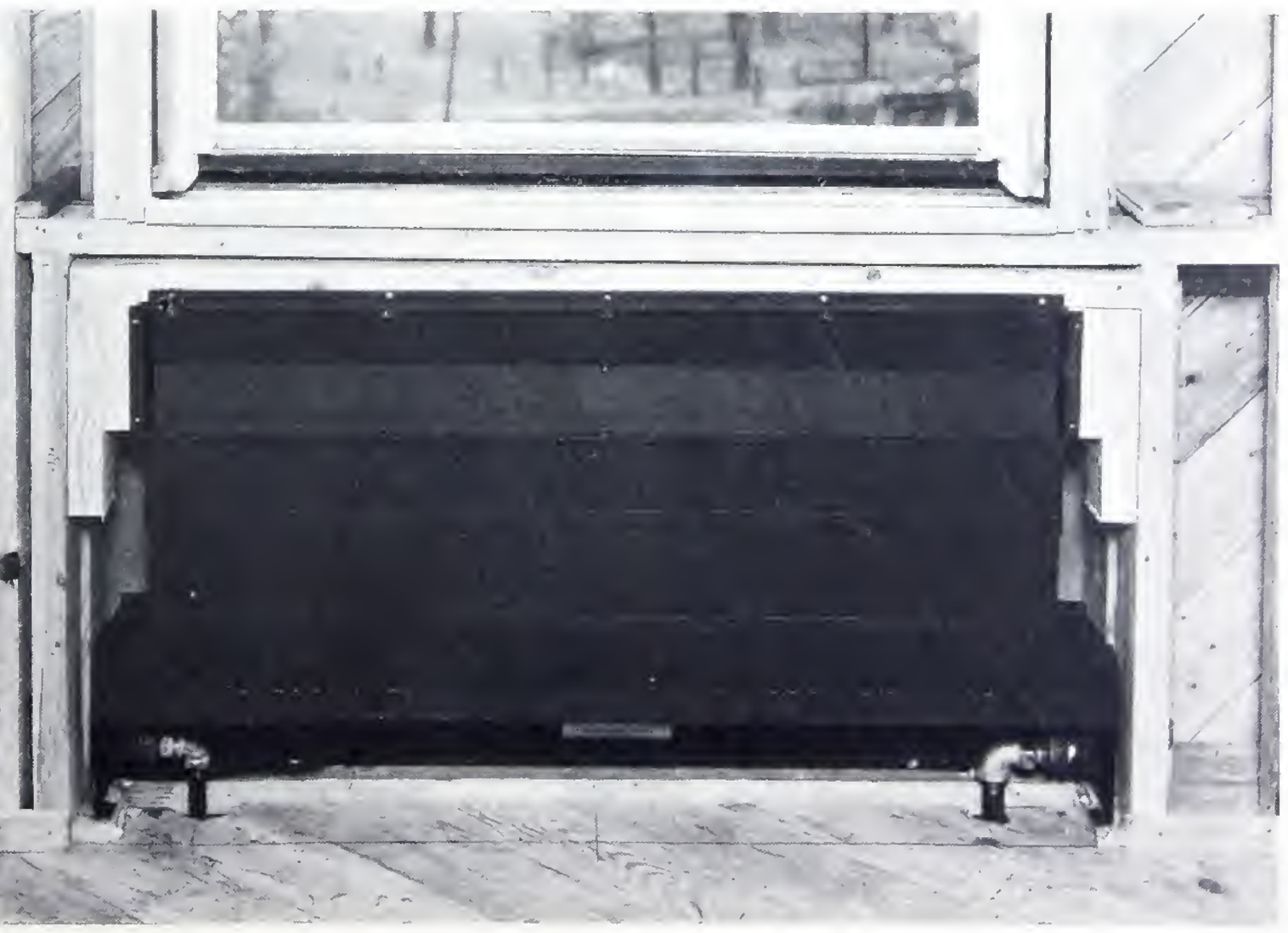


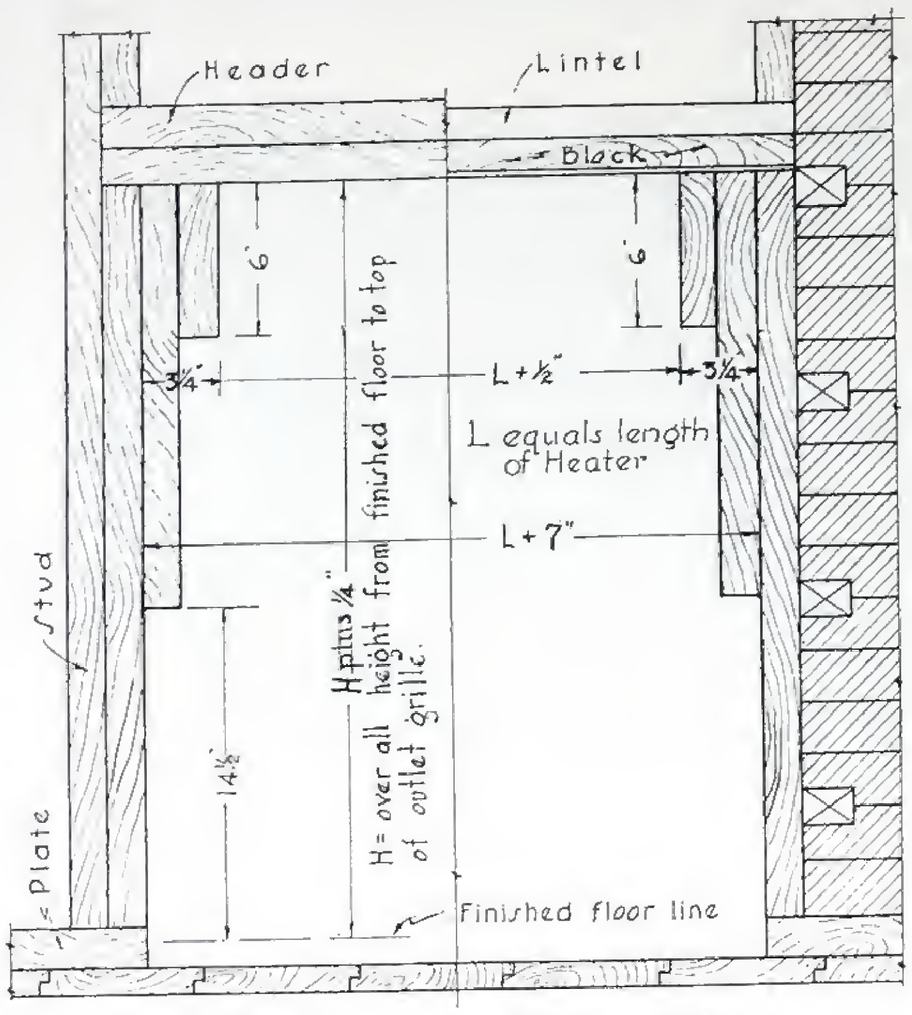


No. 2 In the illustration above is shown the complete Circulair Unit just as it comes from the crate. The grille should now be removed, and set aside in some safe place, as it will not be installed until the building is practically completed. In order that each grille may be properly identified with its particular unit, it is suggested that the identifying tag be removed from the heater and fastened to the grille.

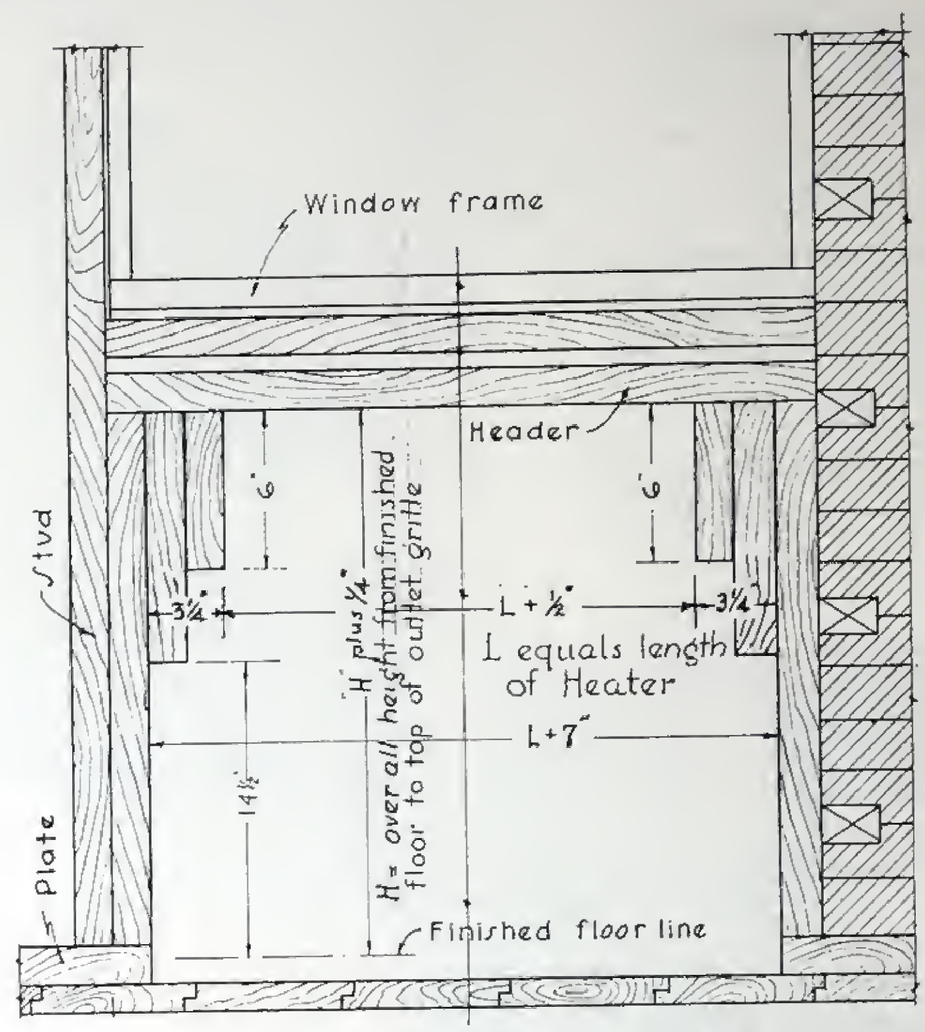


No. 4 As pictured at the right, the Circulair Unit has now been connected to the supply and return pipes, and the boot flanges nailed to the stud framing. The unit is now securely in place, and if the recess has been properly prepared, cannot be shifted out of level. It is recommended, however, that the unit be nailed or screwed to the finish floor later, using the holes provided for that purpose in the tabs turned in at bottom of end plates.

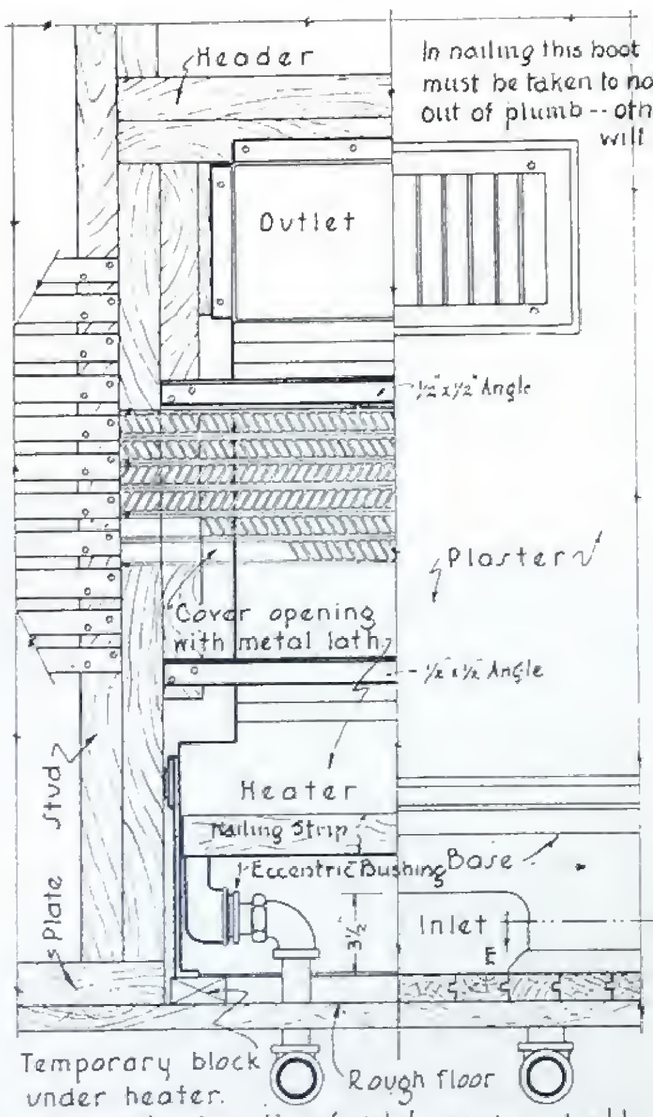
Framing Details



WALL TYPE INSTALLATION (A)

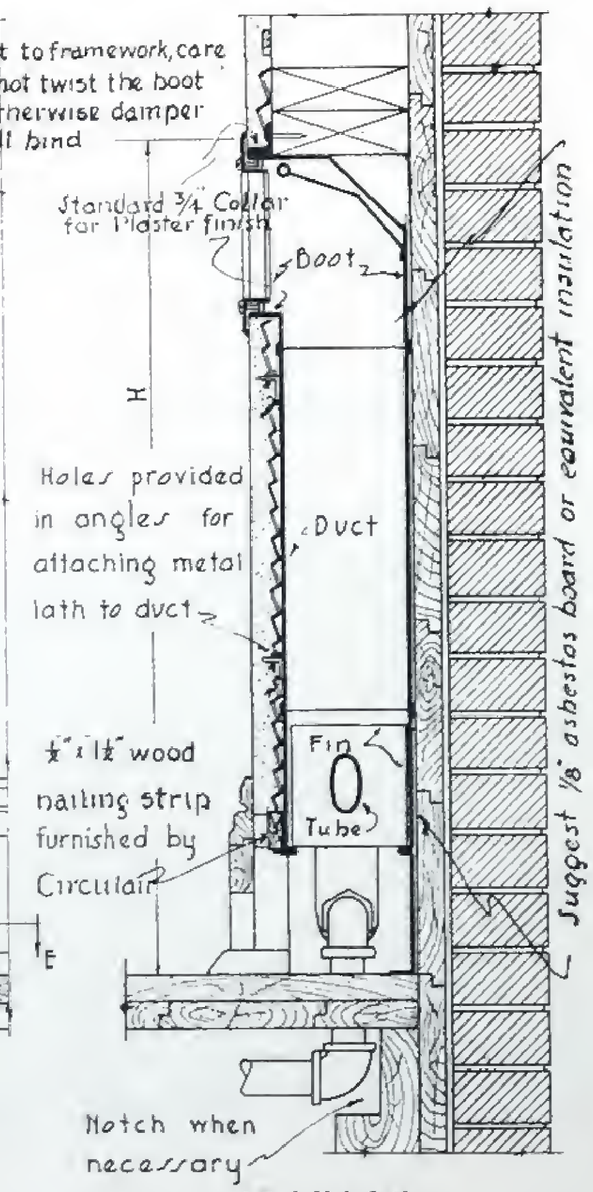


UNDER WINDOW INSTALLATION (B)

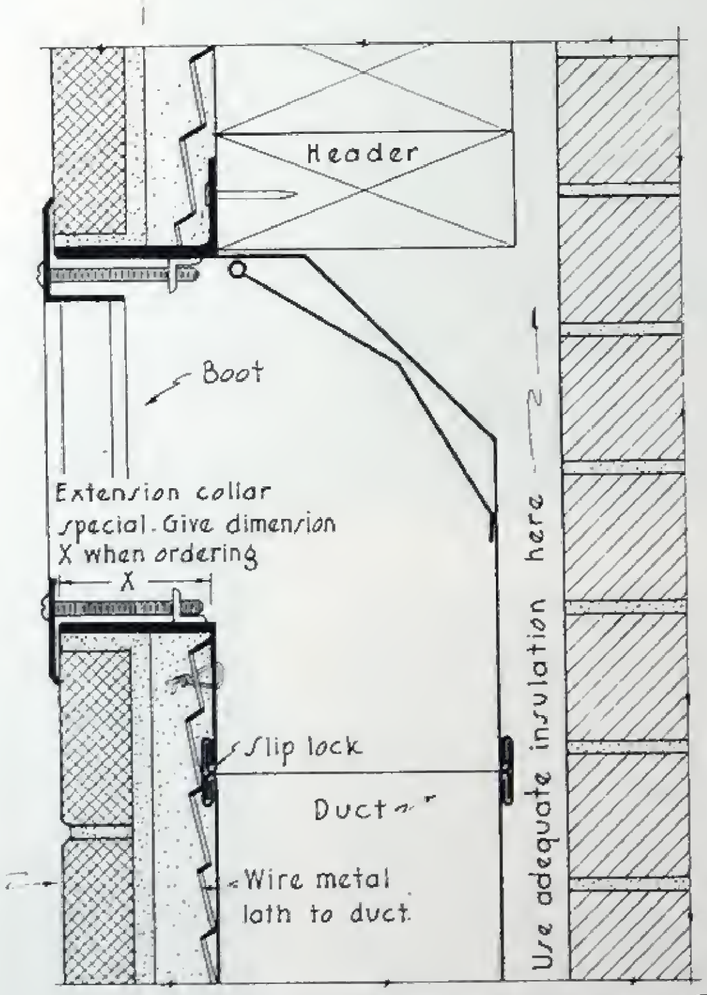


Note: Length of inlet opening should equal length of outlet grille.

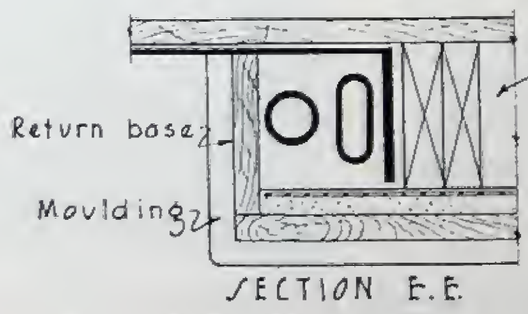
FRONT (A)



SECTION



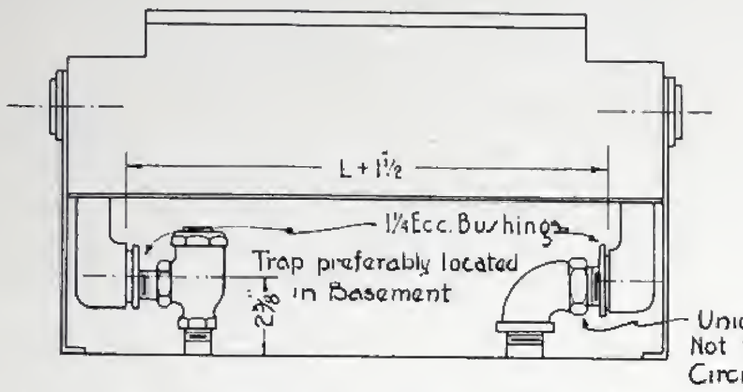
SECTION THRU BOOT & TILE WALL (B)



SECTION E.E.

Note: Level heater with finished floor line and fasten boot and duct in place. After pipe connections are made test job under 15 lbs. pressure. Job may then be plastered.

Connection Details



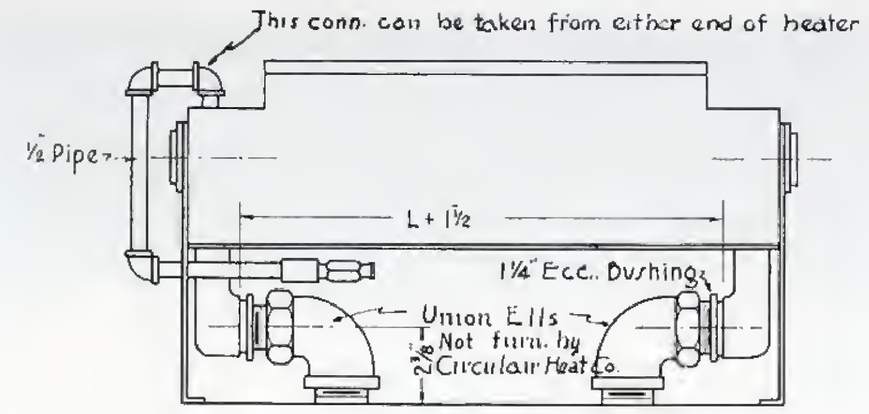
VAPOR AND VACUUM (A)

Note- Drawing shows heater connected Right Hand.

IMPORTANT: Set Heater exactly level

Vacuum-Recommended Pipe Sizes- Vapor

0-50	50-110	110-UP	Capacity	0-30	30-60	60-130
½"	¾"	1"	Supply	½"	¾"	1"
½"	½"	½"	Return	½"	½"	½"

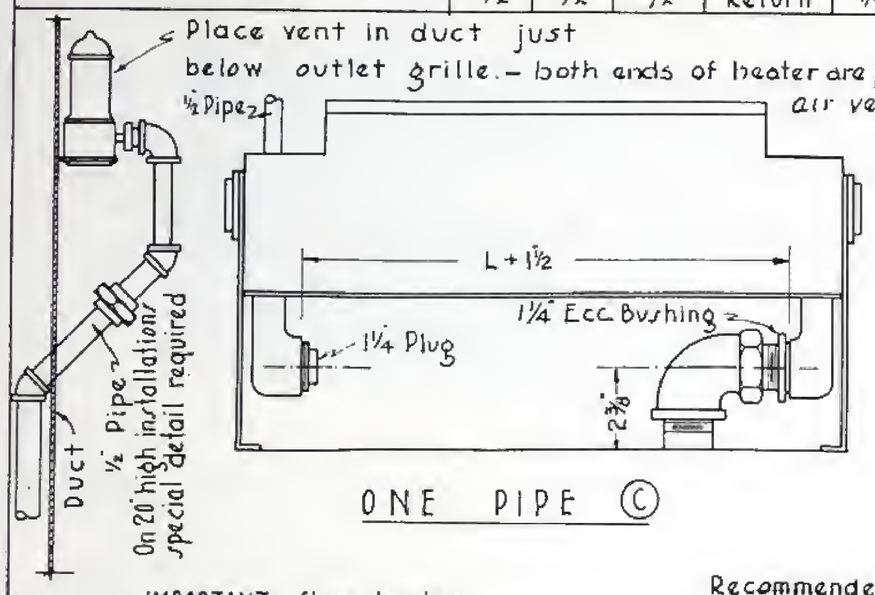


HOT WATER (B)

Note: These connections may be used on any system for installing valves and traps in basement.

Recommended Pipe Sizes
Open Tank System- 1st Floor

Capacity	0-30	30-60	60-100
Supply	¾"	1"	1¼"
Return	¾"	1"	1¼"

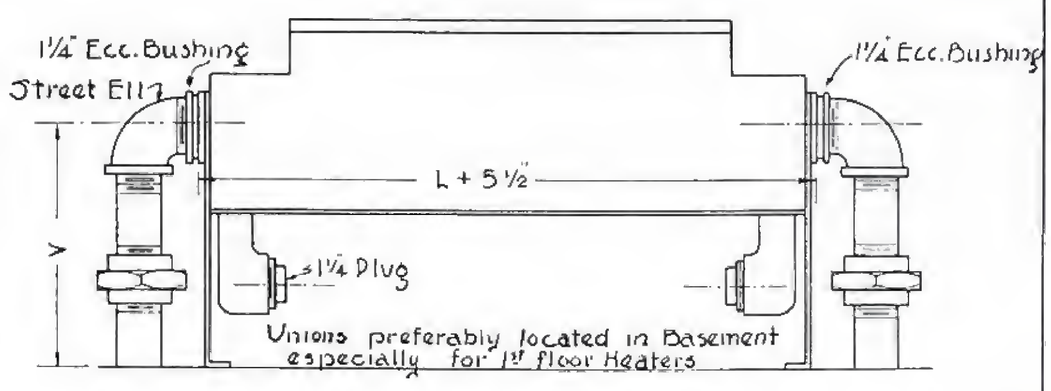


ONE PIPE (C)

IMPORTANT: Slope heater towards supply.

Recommended Pipe Sizes.

Capacity	0-20	21-UP	
Supply	1"	1¼"	



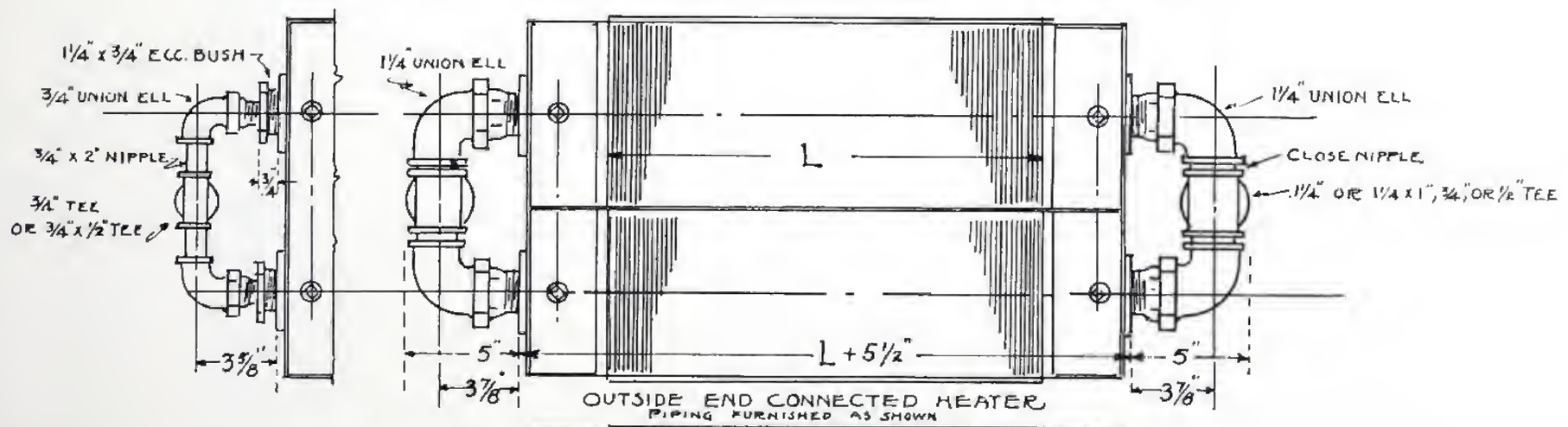
HEATER END CONNECTED- VALVES IN BS'MT.

Size	4	6	8	16
Y	8"	6 5/8	6 5/8	6 5/8

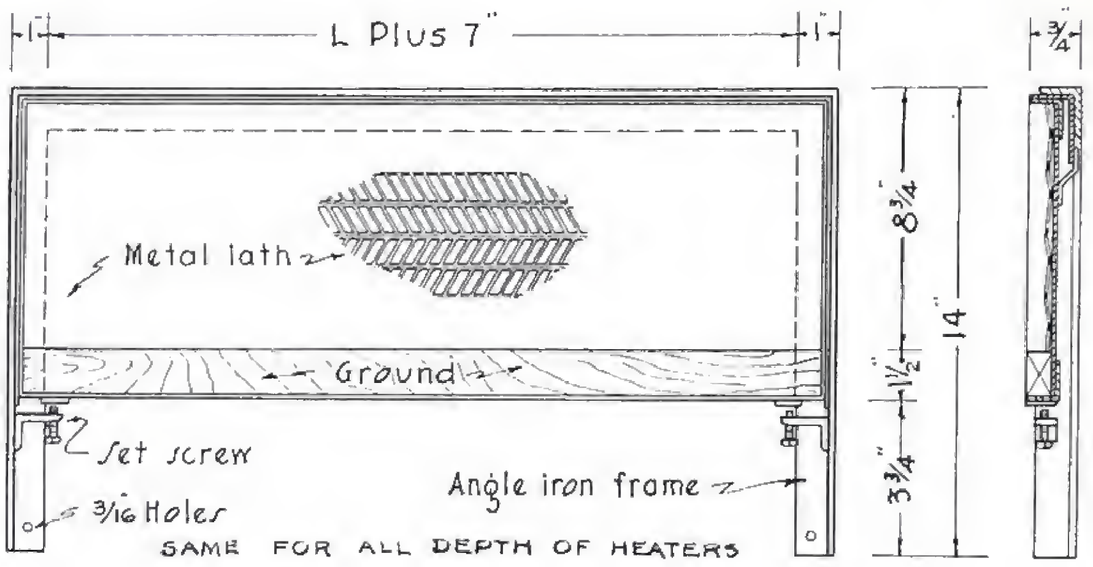
Note: Supply or return connections can be made at either end of heater

STANDARD METHOD OF CONNECTING NO. 16 HEATER

ALL PIPING CONNS. FURNISHED WITH HEATER AS SHOWN



Plaster Panel

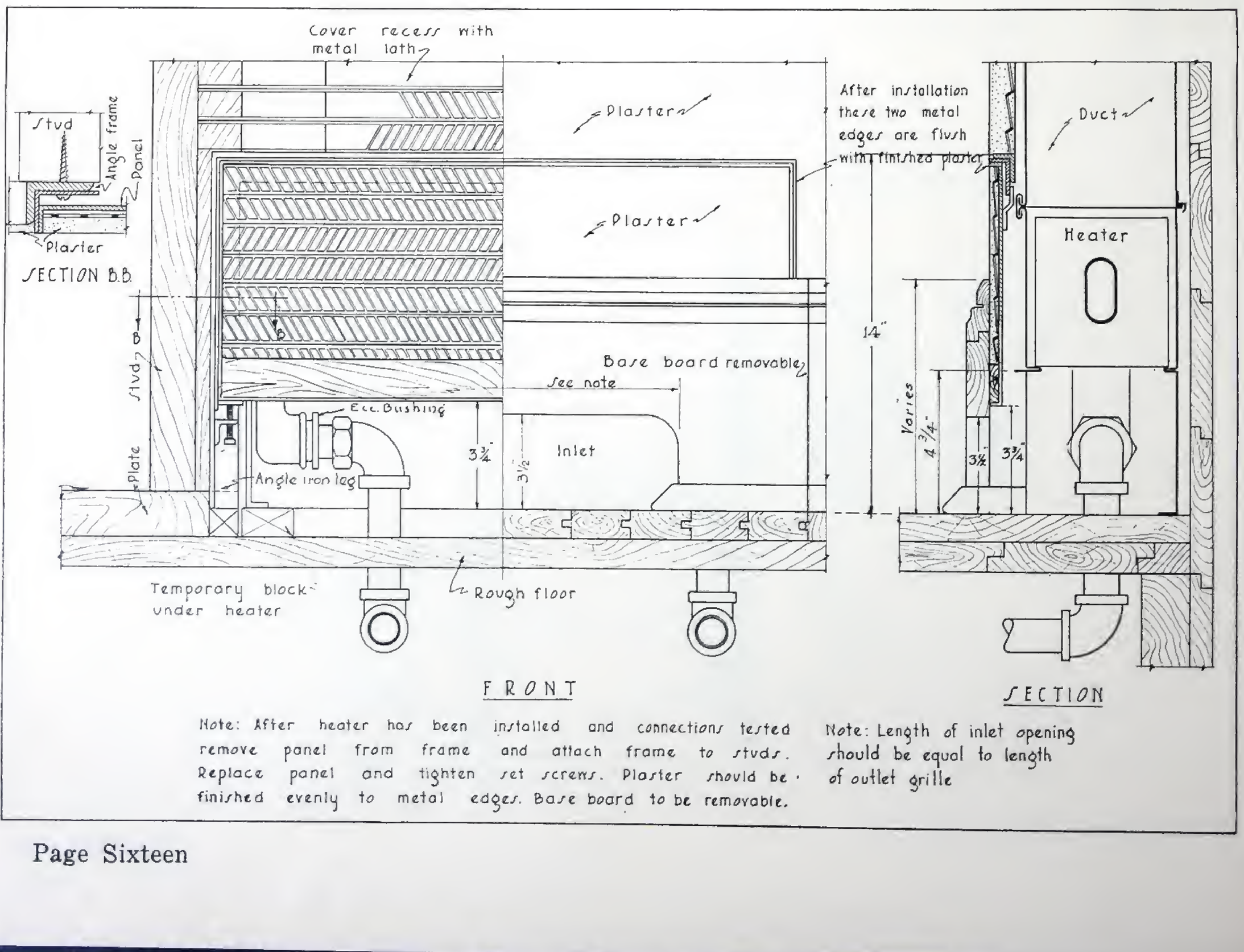


THE REMOVABLE Plaster Panel, an exclusive Circulair feature, gives complete access to the heating element in any concealed installation without marring the appearances of the wall. These panels are carried in stock and are furnished on order at an additional cost.

Certain conditions sometimes make it desirable to secure this removable feature, although for the standard installation the element may safely be plastered in permanently, with full assurance that there it will remain for the life of the building—leak-proof, trouble-proof and corrosion-proof.

The plaster panel is made in one standard height for all types of Circulair heaters. It is shipped complete, ready for plastering. The panel consists of an angle iron frame containing a shallow metal pan lined with expanded metal and held in place by two set screws. The angle iron frame is fastened to the studding and the panel set in and plastered over when the wall is plastered, becoming an integral part of the wall. Only a thin edge of metal around the panel can be seen after the wall is plastered, but being flush with the plaster surface, even this becomes invisible when the wall is finished.

Complete access to heater and piping (when end connections are made to heater) is instantly available by merely removing a small section of baseboard and loosening the two set screws. When the panel is replaced the original appearance of the wall is restored.

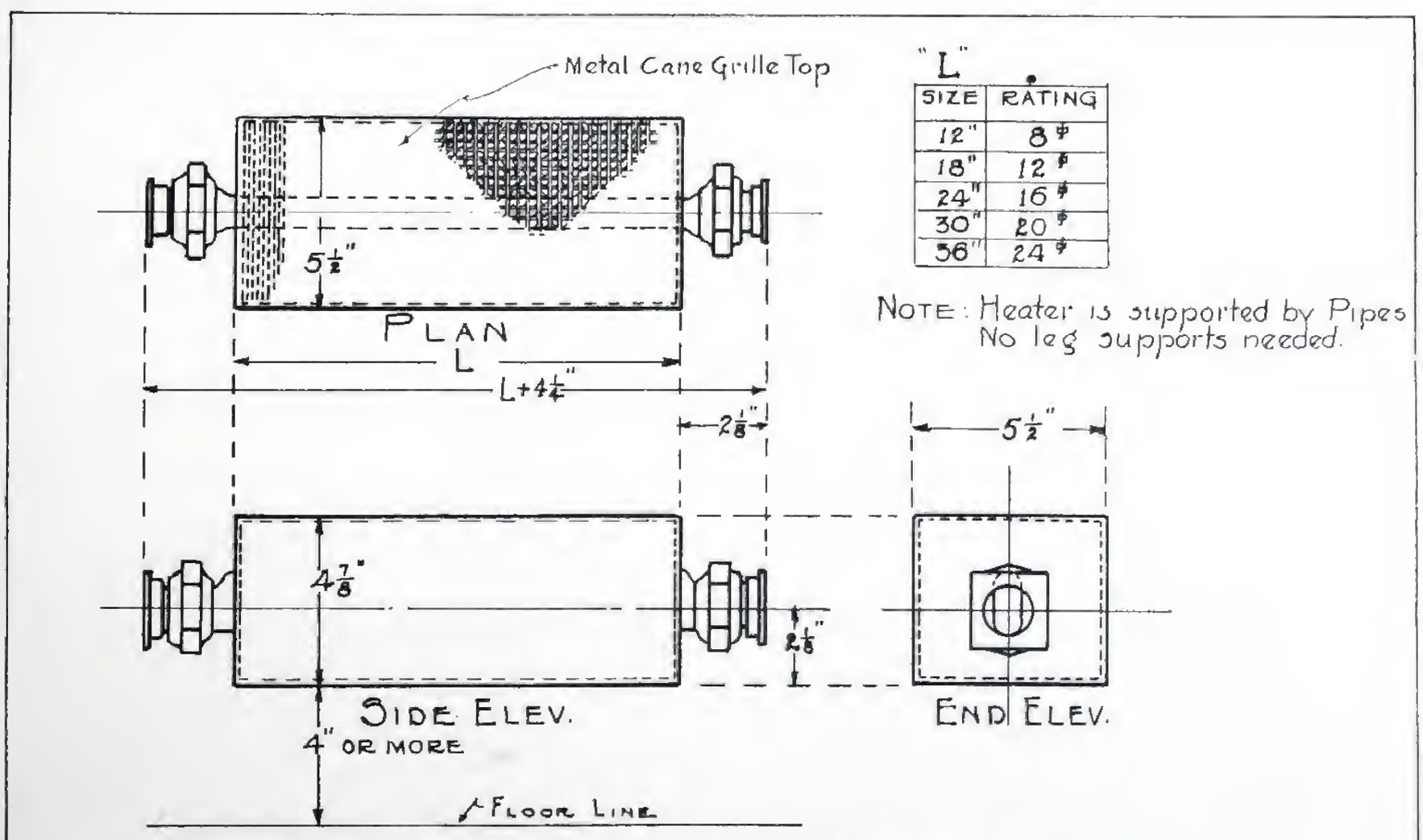


Bath Room Heater

IN BATHS and other small rooms such as kitchenettes, butlers' pantries, attic storage rooms and cellar work shops, it often happens that plumbing piping is so located in the walls as to prevent the use of Concealed Circulair Heaters.

For such conditions, the Circulair Bath Room Heater is available. Its light weight permits its support by the piping connections, at any convenient height above the floor. It takes up a minimum of space, usually under the lavatory or in some other out-of-the-way place.

These exposed Bath Room Heaters are made in a number of sizes as tabulated below. The casing is heavy gauge steel and the top is an attractive grille design. The entire casing is readily removable, and is given a shop or prime coat ready to be finish painted on the job.



"L"

SIZE	RATING
12"	8 #
18"	12 #
24"	16 #
30"	20 #
36"	24 #

NOTE: Heater is supported by Pipes No leg supports needed.

BATH ROOM HEATER

The Cabinet Heater

CIRCULAIR Cabinet type heater has been developed to meet a demand for a light, efficient heater where it is not practical, as when remodeling old buildings, nor desirable, as with certain types of building construction, to install concealed Circulair.

The standard Circulair heating element is used, being enclosed in an attractive cabinet which acts in the same capacity as the sheet metal stack in a concealed installation.

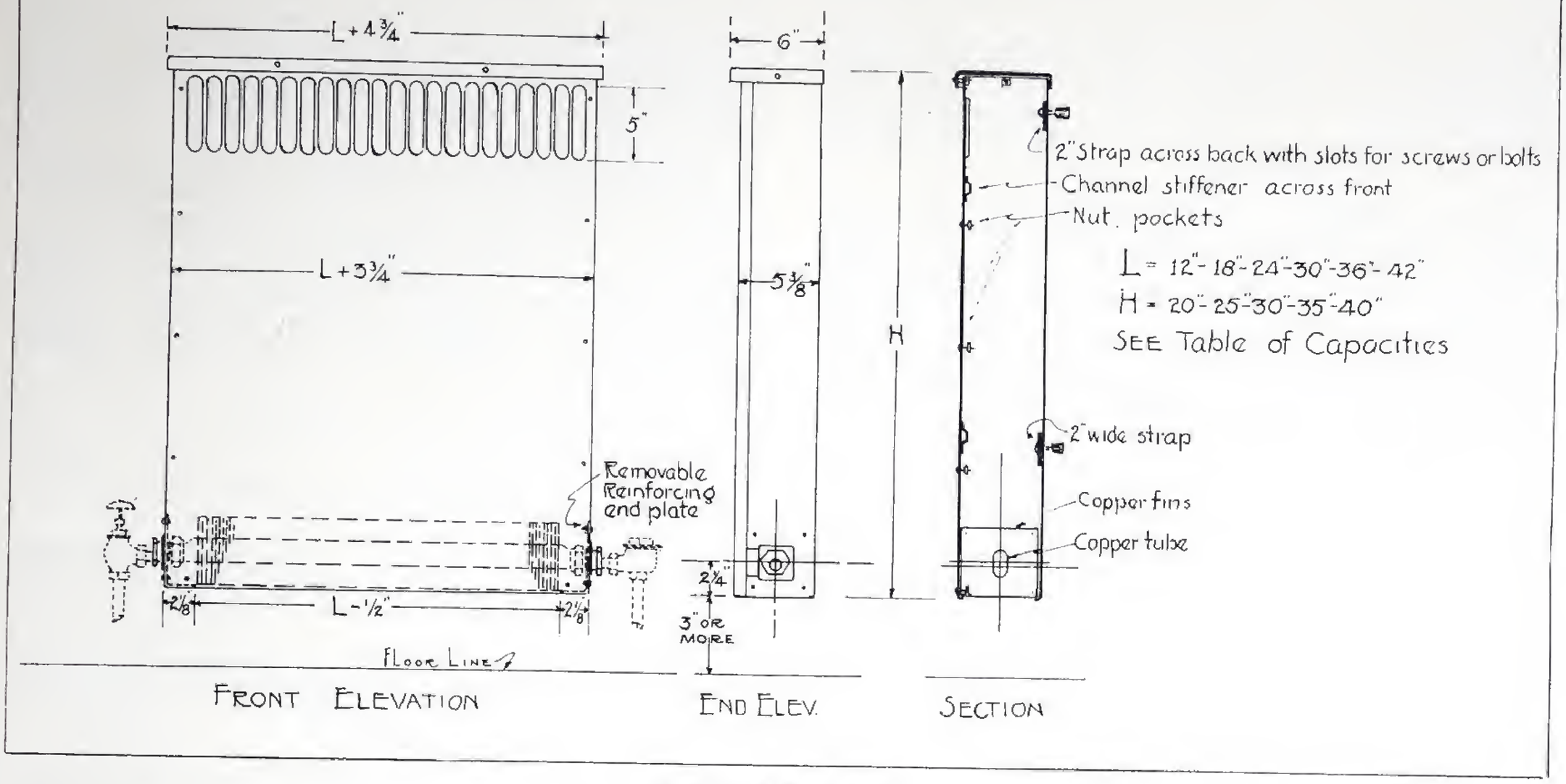
The standard cabinet as illustrated below is but 5⅜" deep. Its light weight allows the cabinet to be hung on light stud partitions, leaving a clear space below the heater for sweeping.

This same cabinet by a slight change in detail of design, may also be recessed back into the wall, exposing only the front cover, which, in such installations, is flush with the wall finish. In this recessed type the total actual overall length is 2" greater than for the exposed type, as shown in the drawing at bottom of page 19. Instead of the end connection used for the exposed type, this recessed type is supplied with the drop-leg bronze casting, allowing steam and return connections to be made underneath the heater, the same as in the standard plastered-in concealed type.

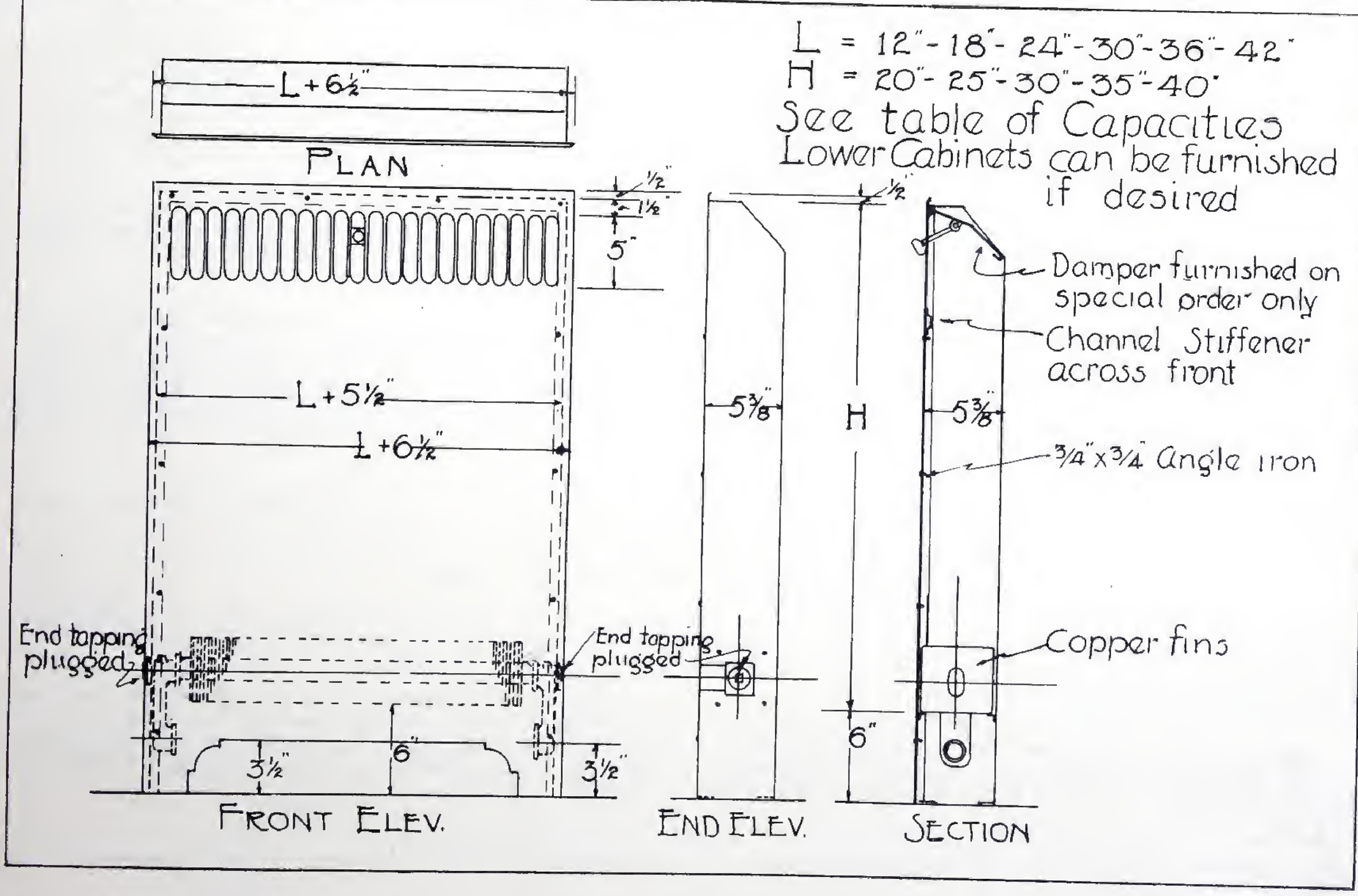
Circulair Cabinets are regularly furnished in priming coat to be finished to match the interior finish after they are installed. Should it be desired, these cabinets for a small additional charge can be finished in mahogany, walnut or oak wood grain to harmonize with the furniture or trim.

Cabinet Heater Details

WALL HUNG TYPE



RECESSED TYPE



Suggested Specifications for Circulair Heat

Standard Specifications for Concealed Type:

HEATING Contractor shall furnish and install where indicated on plans, concealed type heating units as manufactured by CIRCULAIR HEAT COMPANY, Inc., LOUISVILLE, KY. Heaters to be of sizes and capacities marked on plans. Height given to be height from finished floor to top of grille flange.

Heating Element to be extended surface type having hard phosphor copper oval tube with copper fins forced on, and ends of tube connected into cast bronze headers. The entire element to be bonded into an integral unit by metallic bath. Headers to be tapped for both end and underneath connections. Heating element to be mounted in a heavy galvanized iron casing provided with 12 gauge galvanized iron end plates arranged to be fastened securely to floor so that expansion of piping will not raise the heating element out of level.

Stacks to be galvanized iron, provided with "zee" braces inside stack, and with angle stiffeners outside stack, to insure substantial installation, to provide means of fastening unit to studding, and for fastening expanded metal lath to stack.

Damper to be provided in outlet boot, arranged to deflect the air outward from grille, and to be operated by means of brass rod extending through front of grille, arranged so that damper will be held securely in full open or full closed position.

***Grille** to be vertical bar type, bars spaced 1" apart, and with ends securely fastened into pressed steel angle frame. To be adjustable to plaster thickness variations of ½", and to have edge of flange turned back so as to make a neat snug fit against finished wall surface.

*NOTE: If other than bar type grille is desired, specify:

> "**Grille** *to be 14 gauge stamped steel Grecian No. 4 (or Gothic No. 3) design, set into pressed steel angle frame. To be adjustable to plaster thickness variations of ½", and to have edge of flange turned back so as to make a neat, snug fit against finished wall surface.*

Entire Unit Assembly to be complete, assembled in factory ready to be installed in recess, and joints between heater casing, stack and boot shall be practically airtight.

Insulation of recess will be provided by the General Contractor, before heater is installed. (Note: This insulation is recommended to be ¼" thick asbestos board, secured to back of recess.)

Painting, except finish coat on grille, to be done before heaters are shipped. Painting to consist of spray coat of dull black enamel on entire outside of unit, and on inside of inlet and outlet openings, and damper. Grille to have prime coat of gray.

Pipe Connections to be made in accordance with details furnished by manufacturer. Care must be taken that no traps are formed for collection of condensation, and a good pitch given to piping from heater inlet connection back to supply main, and from heater outlet back to return main. Heaters to be nailed or screwed securely in place before pipe connections are made, *care being taken to have the heater absolutely level, or pitched very slightly toward the return end.

*NOTE: Above for two pipe systems. If one pipe system is used, specify:

> "And return end blocked up ¼" to ⅜" higher than supply end to insure good drainage."

Supply Valve to be placed in basement supply runout for control of each separate unit or stack of same. No radiator valves to be used at heater location.

***Return Traps** to be located in basement for first floor units, and to be back outlet type of make approved by architect. Other traps to be angle pattern located behind the baseboard under heating unit.

*NOTE: Above for two pipe vapor or vacuum systems. If one or two pipe gravity system is used, omit Return Traps and specify:

> "**Air Valve** *to be provided for each heater, placed inside duct below outlet boot in such position as to be easily accessible when grille is removed. To be connected into ½" pipe taken out of vent tapping in top of bronze end casting and run through side of galvanized iron stack, using two 45° ells.*"

Testing of piping system to be done before plastering is begun. All concealed radiators to be tested under at least 10 pounds steam pressure, and all pipe leaks in piping system made absolutely tight.

Guarantee: Contractor to guarantee all parts of the heating system against defects in workmanship or material for a period of one year from date of final acceptance, and to further guarantee the CIRCULAIR HEAT ELEMENT to be free from leaks or mechanical imperfections for the life of the original installation.

Short Specifications for Concealed Type:

HEATING Contractor shall furnish and install where indicated, in accordance with attached schedule, concealed heaters of capacities marked.

These heaters to be standard units as manufactured by the Circulair Heat Company, Louisville, Ky. To be extended surface type having hard phosphor copper oval tube with copper fins forced on, and ends of tube connected into cast bronze headers.

Heaters to be complete with galvanized ducts and outlet boot, with damper and vertical bar type grille, all assembled and shipped ready to install in wall. Heater element to be guaranteed against leaks for the life of the original installation.

Short Cuts in Calculating Radiation Requirements

THERE are several rule of thumb methods in use today for determining the radiation required in a building. These methods are based on average building conditions and most of them contain a factor which is to be varied to suit any unusual type of construction, or unusual characteristic of the space to be heated. All of them are based on a temperature difference of 70 degrees between outside and inside air. These comparatively rough rules are employed in the case of large buildings only as a check on the more refined formulas, but on residences they may be used satisfactorily.

Heat in an enclosure is lost through walls, windows, doors, ceiling and floors. Also much of it is lost due to the infiltration of air or the exhaust of air. These heat losses vary according to the type of construction, the size of the room, the temperature of the outside air, and the number of air changes per hour which occur within the enclosure. Following is Carpenter's rule which is intended to be used where the walls are of fair construction:

C—Cu. ft. contents of room.
N—Number of air changes per hour.
.02—B. T. U. to raise one Cu. ft. air one degree F.
W—Net outside wall area in sq. ft.
G—Glass area exposed to outside temperature.
T—Temperature difference between outside and inside.

FORMULA:

$H = (.02\ NC + G + \frac{1}{4}W)\ T.$

H—Being heat required in B. T. U.'s.

The following illustrates the method of working a problem by the above formula: the room is 20′ x 20′, ceiling height 10′ and two walls are exposed; two 6′ x 6′ windows and one 3′ x 8′ door.

$G = 2\ (6 \times 6) + (3 \times 8) = 96$
$C = 20 \times 20 \times 10 = 4000$
$W = (20 + 20)\ 10 - 96 = 304$
$H = (.02 \times 2 \times 4000) + 96 + \frac{1}{4}$ of 304) all $\times 70 = 23{,}400$ B.T.U.
(240 BTU per sq. ft. of radiation)
$23{,}400 \div 240 = 96.8$ sq. ft. radiation.

Mill's Rule is commonly used but, perhaps, is not quite so accurate as Carpenter's, though much easier to handle. It is also based on 70 degrees difference between inside and outside air.

R=Amount of radiation in sq. ft.
$R = C/200 + W/20 + G/2$
C, W, G, same as above.

The rule used by a large cast iron radiator company is as follows:

$R = 6C + 80W + 300G$ all $\div$ by 1000.

When using this rule W is modified according to wall constructions and the constant 80 is changed as per the following table:

8″ Brick—120W	Frame Wall without sheathing.....120W
12″ " — 80W	Frame Wall with sheathing..... 80W
16″ " — 70W	Frame Wall with sheathing and paper..... 65W
20″ " — 60W	Stud partitions with plaster on both sides.....100W
	Floor..... 40W
	Ceiling with unheated space above.. 40W

(Last method usually preferred, adding 10% for safety.)

Circulair Heater Supply and Return Connection Sizes for Various Systems

1 Pipe Gravity:

Plug L. H. vent opening only.
Provide *supply* eccentric bushing (not plugged) in L. H. end and plug R. H. end 1¼″:

SUPPLY	RETURN
0 to 20 sq. ft.—1″	Plugged 1¼″
21 sq. ft or over—full size	

2 Pipe Gravity:

Plug L. H. vent opening only.
Provide *supply* eccentric bushing (not plugged) in L. H. end and return eccentric bushing (not plugged) in R. H. end as follows:

SUPPLY	RETURN
0 to 30 sq. ft.—¾″	0 to 122 sq. ft.—¾″
31 sq. ft to 56 sq. ft.—1″	123 sq. ft. to 190 sq. ft.—1″
57 sq. ft. and up—full size	191 sq. ft. and up—full size

2 Pipe Vapor:

Plug both air vent openings.
Provide *supply* eccentric bushing (not plugged) in L. H. end and return eccentric bushing (not plugged) in R. H. end as follows:

SUPPLY	RETURN
0 to 30 sq. ft.—½″	0 to 130 sq. ft.—½″
31 sq. ft. to 60 sq. ft.—¾″	131 sq. ft. and up—¾″
61 sq. ft. to 130 sq. ft.—1″	

2 Pipe Vacuum Systems:

Plug both air vent openings.
Provide *supply* eccentric bushing (not plugged) in L. H. end and return eccentric bushing (not plugged) in R. H. end as follows:

SUPPLY	RETURN
0 to 50 sq. ft.—½″	0 to 110 sq. ft.—½″
51 sq. ft. to 110 sq. ft.—¾″	111 sq. ft. and up—¾″
111 sq. ft. and up—1″	

Hot Water Systems:

Plug L. H. Vent opening only.
Provide eccentric bushings (not plugged) in both ends. (Both ends the same):

PRESSURE SYSTEM	OPEN TANK SYSTEM
1st fl.	1st fl.
0 to 60 sq. ft.—¾″	0 to 30 sq. ft.—¾″
61 sq. ft. to 100 sq. ft.—1″	31 sq. ft. to 60 sq. ft.—1″
101 sq. ft. to 160 sq. ft.—1¼″	61 sq. ft. to 100 sq. ft.—1¼″
2nd fl.	2nd fl.
0 to 100 sq. ft.—¾″	0 to 40 sq. ft.—¾″
101 sq. ft. to 160 sq. ft.—1″	41 sq. ft. to 100 sq. ft.—1″
161 sq. ft. and up—full size	101 sq. ft. to 200 sq. ft.—1¼″
3rd fl.	3rd fl.
0 to 120 sq. ft.—¾″	0 to 50 sq. ft.—¾″
121 sq. ft. to 200 sq. ft.—1″	51 sq. ft. to 125 sq. ft.—1″
	125 sq. ft. and up—full size

NOTE:—All Circulair Heaters plugged and bushed in accordance with above schedule unless otherwise instructed.

A Few Representative Circulair Installations

Residences:

Donfrio Residence.....*Phoenix, Ariz.*
Douglas Dacre Stone.....*Oakland, Calif.*
Clarence R. Walters.....*Atherton, Calif.*
Carleton Palmer.....*Fairfield, Conn.*
Van Sinderen Residence.....*Washington, Conn.*
Robert E. Lee Mansion (Arlington Cemetery)
Washington, D. C.
Gertrude Atherton.....*Washington, D. C.*
Norwegian Embassy.....*Washington, D. C.*
Crocker Residence.....*Pebble Beach, Fla.*
DuPont Residence.....*Jacksonville, Fla.*
Balfour Residence.....*Thomasville, Ga.*
Lambert Residence.....*Brunswick, Ga.*
H. C. Rockfield.....*Chicago, Ill.*
J. H. Milliken.....*Chicago, Ill.*
H. H. Bushong.....*Indianapolis, Ind.*
Walter Scholer.....*Lafayette, Ind.*
Ed. S. Marks.....*Salina, Kans.*
Judge Lafon Allen.....*Louisville, Ky.*
A. E. Markham.....*Louisville, Ky.*
A. D. Reynolds.....*Louisville, Ky.*
W. M. Reed.....*Louisville, Ky.*
Chas. R. Long, Jr. .....*Louisville, Ky.*
Mrs. A. T. Hert.....*Louisville, Ky.*
Eyler Residence.....*Baltimore, Md.*
John E. Chatman.....*Boston, Mass.*
J. Insull.....*Springfield, Mass.*
Robert Newman.....*Detroit, Mich.*
Ralph C. Peckham.....*Detroit, Mich.*
Max Skeer.....*Kansas City, Mo.*
Bixby Residence.....*St. Louis, Mo.*
Milton B. Badt.....*Elko, Nev.*
Tarry Residence.....*Interlaken, N. J.*
Bernhardt Residence.....*South Orange, N. J.*
Eddie Cantor.....*Brooklyn, N. Y.*
Cullen Residence.....*Buffalo, N. Y.*
Dr. Duckworth Residence.....*White Plains, N. Y.*
Francis T. Hunter.....*New Rochelle, N. Y.*
R. D. Gorham.....*Wilson, N. C.*
Homewood Residence.....*Pinehurst, N. C.*
Tafel Residence.....*Piqua, Ohio*
Copeland Residence.....*Columbus, Ohio*
Richard Lloyd Jones.....*Tulsa, Okla.*
W. A. Tyler.....*Portland, Ore.*
C. J. Williams.....*Philadelphia, Pa.*
L. H. Thayer.....*New Castle, Pa.*
Grace Phillips Johnson.....*New Castle, Pa.*
Pollock Residence.....*Pittsburgh, Pa.*
Crittenden Residence.....*Bradford, Pa.*
I. S. Rainwater.....*Florence, S. C.*
Newman Cheek.....*Nashville, Tenn.*
Roden Clift.....*Nashville, Tenn.*
Mark K. Wilson.....*Chattanooga, Tenn.*
Martin Ross Baker.....*Knoxville, Tenn.*
Edgar Fox.....*Austin, Tex.*
General Hinds.....*San Antonio, Tex.*
Ball Residence.....*Port Arthur, Tex.*
Moody Ranch House.....*Kerrville, Tex.*
G. Harry Wilmore.....*Fairhaven, Vt.*
Honeywell Residence.....*Belle Grove, Va.*
Simonson Residence.....*Yakima, Wash.*
Mrs. E. F. Garrett.....*Bridgeport, W. Va.*
Robert E. Hackett.....*Milwaukee, Wis.*

Schools, Colleges and Convents:

Morningside School.....*Los Angeles, Calif.*
New Britain State Normal School.....*New Britain, Conn.*
Anthony J. Bowen School.....*Washington, D. C.*
Oakton School.....*Evanston, Ill.*
Smith College.....*Northampton, Mass.*
John J. Pershing School.....*Detroit, Mich.*
St. Peter's Parochial School.....*Kansas City, Mo.*
Creighton University.....*Omaha, Neb.*
St. George's Monastery.....*Cincinnati, Ohio*
Jackson High School.....*Dayton, Ohio*
Keith, Jr. High School.....*Altoona, Pa.*
Herriman School.....*Salt Lake City, Utah*

Hospitals:

Palo Alto Hospital.....*Palo Alto, Calif.*
Walter Reed Hospital Chapel.....*Washington, D. C.*
St. Elizabeth Hospital.....*Lafayette, Ind.*
Shriners Crippled Children's Hospital.....*Springfield, Mass.*
Jackson County Hospital.....*Little Blue, Mo.*
Perth Amboy Hospital.....*Perth Amboy, N. J.*
Danville State Hospital.....*Danville, Pa.*
Protestants Orphans Home Hospital.....*San Antonio, Tex.*
Eastern State Hospital.....*Spokane, Wash.*

Churches:

Bethlehem Church.....*Washington, D. C.*
Holy Trinity Church.....*Louisville, Ky.*
"Our Lady of the Sacred Heart" Church.....*Springfield, Mass.*
St. Andrews Parish Building.....*Detroit, Mich.*
Carondelet Presbyterian Church.....*St. Louis, Mo.*
Church of the Assumption.....*Passaic, N. J.*
First Presbyterian Church.....*Greensboro, N. C.*
St. Peter's Church.....*Grove City, Ohio*
St. Monica's Church.....*Philadelphia, Pa.*
Methodist Church.....*Del Rio, Tex.*
Bethlehem Lutheran Church.....*Richmond, Va.*

Clubs, Lodges and Fraternities:

Scottish Rite Temple.....*Louisville, Ky.*
Auto Club of California.....*Los Angeles, Calif.*
Deer Creek Park Club.....*Chicago, Ill.*
Deer Creek Club.....*Webster Groves, Mo.*
Manhassett Bay Yacht Club.....*Long Island, N. Y.*
Maketewah Country Club.....*Cincinnati, Ohio*
Carthage Masonic Lodge.....*Cincinnati, Ohio*
Sigma Nu Fraternity House.....*Columbus, Ohio*
Sigma Alpha Nu Fraternity House.....*Philadelphia, Pa.*
Cavalier Saddles, Inc. Club House.....*San Antonio, Tex.*
Y. M. C. A.....*Chattanooga, Tenn.*
Y. M. C. A. .....*Beaumont, Tex.*
Y. M. C. A.....*Huntington, W. Va.*

Apartments, Hotels, Stores and Theaters:

Princess Issenna Hotel.....*Dayton Beach, Fla.*
Wagar Apartments.....*Atlanta, Ga.*
Hook Drug Store.....*South Bend, Ind.*
Deleberto Apartments.....*Brookline, Mass.*
Plaza Theater.....*St. Louis, Mo.*
Riveria Apartments.....*Kansas City, Mo.*
Chas. Schneider Store.....*Avon, N. J.*
Berla Bros. Store.....*Newark, N. J.*
I. Miller Store.....*New York, N. Y.*
Loew's Concourse Theater.....*New York, N. Y.*
Strand Theater.....*Middletown, Ohio*
Latonia Theater.....*Oil City, Pa.*
Adolphus Hotel.....*Dallas, Tex.*

Capacity Table

Capacities shown are in terms of equiv. sq. ft. of direct radiation—
One sq. ft. of radiation equals 240 B. T. U. per hour.

No. 4 CONCEALED TYPE—For Installation Between 2 x 4 Studs

Nominal Length of Heater "L"	OVERALL (STACK HEIGHT) "H"							
	20"	25"	30"	40"	50"	60"	70"	80"
12"	8.0	9.3	10.7	13.1	15.2	16.8	17.9	18.7
18"	12.0	14.0	16.0	19.6	22.8	25.2	26.8	28.0
24"	16.0	18.7	21.1	26.2	30.1	33.0	35.8	37.4
30"	20.0	23.3	26.7	32.7	38.0	42.0	44.7	46.7
36"	24.0	28.0	32.0	39.2	45.5	50.5	53.7	56.2
42"	28.0	32.7	37.4	45.8	53.2	58.7	62.6	65.4
48"	32.0	37.3	42.3	52.4	60.8	66.0	71.6	74.8
54"	36.0	42.0	48.0	58.8	68.4	75.6	80.4	84.0
60"	40.0	46.6	53.4	65.4	76.0	84.0	89.4	93.4

No. 6 CONCEALED TYPE—For Installation Between 2 x 6 Studs

12"	10.0	11.1	12.6	15.3	17.6	19.3	20.8	22.1
18"	15.0	16.6	18.9	23.0	26.3	29.0	31.3	33.1
24"	20.0	22.2	25.3	30.6	35.1	38.7	41.7	44.1
30"	25.0	27.7	31.6	38.3	43.9	48.4	52.1	55.2
36"	30.0	33.2	37.9	45.9	52.7	58.0	62.5	66.2
42"	35.0	38.8	44.2	53.6	61.5	67.7	72.9	77.2
48"	40.0	44.3	50.6	61.3	70.2	77.4	83.4	88.2
54"	45.0	49.2	56.7	69.0	78.9	87.0	93.9	99.3
60"	50.0	55.4	63.2	76.6	87.8	96.8	104.2	110.4

No. 8 CONCEALED TYPE—For Installation Between 2 x 8 Studs

12"	12.0	14.2	15.8	18.5	20.8	22.7	24.6	25.8
18"	18.0	21.3	23.7	27.8	31.2	34.1	36.9	38.7
24"	24.0	28.4	31.6	37.0	41.6	45.4	49.2	51.6
30"	30.0	35.5	39.5	46.3	52.0	56.8	61.5	64.5
36"	36.0	42.5	47.4	55.5	62.4	68.2	73.8	77.4
42"	42.0	49.7	55.3	64.8	72.8	79.5	86.1	90.3
48"	48.0	56.8	63.2	74.0	83.2	89.6	98.4	103.2
54"	54.0	63.9	71.1	83.4	93.6	102.3	110.7	116.1
60"	60.0	71.0	79.0	92.6	104.0	113.6	123.0	129.0

No. 16 CONCEALED TYPE—For Installation In 16" Recess

12"	24.0	28.4	31.6	37.0	41.6	45.4	49.2	51.6
18"	36.0	42.6	47.4	55.6	62.4	68.2	73.8	77.4
24"	48.0	56.8	63.2	74.0	83.2	90.8	98.4	103.2
30"	60.0	71.0	79.0	92.6	104.0	113.6	123.0	129.0
36"	72.0	85.0	94.8	111.0	124.8	136.4	147.6	154.8
42"	84.0	99.4	110.6	129.6	145.6	159.0	172.2	180.6
48"	96.0	113.6	126.4	148.0	166.4	179.2	196.8	206.4
54"	108.0	127.8	142.2	166.8	187.2	204.6	221.4	232.2
60"	120.0	142.0	158.0	185.2	208.0	227.2	246.0	258.0

WALL HUNG CABINET HEATER

Length of Heater "L"	OVERALL HEIGHT "H"				
	20"	25"	30"	35"	40"
12"	11.1	12.6	14.0	15.3	16.5
18"	16.6	18.9	21.0	23.0	24.7
24"	22.2	25.3	28.0	30.6	32.9
30"	27.7	31.6	35.0	38.3	41.1
36"	33.2	37.9	41.9	45.9	49.3
42"	38.8	44.2	48.9	53.6	57.6

BATH ROOM HEATER

Length	Capacity
12"	6.0
18"	9.0
24"	12.0
30"	15.0
36"	18.0

Cabinet Heaters made in No. 6 size only. Overall height "H" is from bottom of fins to top of cabinet. Bottom of cabinet to be at least 3" above floor line.

Ratings

THE ratings of Circulair Heaters published on Page 23 are based on exhaustive tests conducted in the Frost Laboratories in Norristown, Pa., and on later check tests in various University Laboratories, and in the Carrier Engineering Company's plant. Even more recent rating tests have been made in the Circulair plant laboratory, using the set-up and formulae as recommended in the report of the Special Committee appointed in 1930 by the American Society of Heating & Ventilating Engineers.

All of these various tests have given increasingly convincing evidence of the correctness of Circulair ratings. They are fully guaranteed by the Company.

Circulair Heaters were designed primarily for use with steam, vapor or vacuum systems of heating, although they are as efficient for use with hot water systems as any other concealed radiator on the market. Many successful Circulair installations have been made, using Hot Water as the medium of heat exchange. It must be borne in mind that in the latter, the heat transmission factor is considerably lower than it is for steam, and that this transmission varies with different mean temperatures of the water in the radiator. This fact makes it undesirable to publish rating tables for Hot Water, lacking exact data as to the temperature to be carried on the boiler for each individual job.

In order, therefore, to avoid any possible disappointment in their use with hot water, it is considered advisable that our factory engineers be consulted in connection with such proposed systems. Data should be submitted as to the type of system, and the temperature and pressure to be carried on the boiler.

In general Circulair Heaters will be found more satisfactory for use with steam heating systems, entirely on account of the increased amount of radiating surface necessary when used with hot water, with the consequent increase in cost.

An Unusual and Convincing Test

A VERY severe test of Circulair Heaters was made under the supervision of Mr. Walter S. Timmis, A. S. M. E., a well-known consulting engineer of New York City. A standard Circulair heater element was first filled with water and all openings plugged tightly. This heater was then placed in a cold storage room which was kept constantly at a temperature of 2° below zero. The Circulair element was left in this cold storage room for a period of three days, then, for purposes of record, was photographed in the cold storage room, and then removed for test purposes. The plugs were removed from the steam and return ends of the unit, and it was found that the unit was full of ice right up to the plugs.

Quoting from Mr. Timmis' official report to us, dated January 24th, 1928, he makes the following statement: "A steam connection was then applied to the supply end and a sylphon trap to the return end of the unit; when steam was applied the ice within the unit melted very quickly and steam up to 15 pounds pressure was applied. After removing the syphon trap, a plug was inserted at the return end and steam was applied up to 75 pounds pressure. The coil stood up to this unusual test without any impairment whatever, and without signs of leak or fatigue in any part. It is my opinion that these units will never be called upon for a test as severe as this one was, because the heater tube was filled solid with water and then frozen, which, of course, would be improbable under working conditions."

This demonstrates conclusively the leak-proof properties of Circulair heating elements, and discloses the sturdy construction of the unit throughout.

In Conclusion

THE CIRCULAIR Heat Company is convinced of the fundamental correctness of the design of Circulair products.

No changes have been made in these fundamental principles since its introduction to the public more than four years ago, after months of research and testing in the laboratory. No changes are anticipated in the fundamental design. Continued research has proven over and over that the combination of materials embodied in the original design is the most efficient and permanent possible to be had.

Cost of these materials is high as compared to other combinations of metal. Attempts on our part to lower the cost of Circulair by the use of cheaper and less permanent metals have resulted in every instance in lowered efficiency, and a lessening of the useful life of the product.

We are, therefore, taking advantage of this feature of permanence and passing this advantage on to the buying public by putting a guarantee of *life-long leak-proof performance* on every Circulair heating element made in our factory.

Circulair Sales Agencies

Boston, Mass.	10 High Street	*Tompkins-Stoddard Company*
Bridgeport, Conn.	128 Stella Street	*Seeley & Jones*
Charlotte, N. C.	107-9 Kinney Building	*L. J. Hamilton Company*
Chattanooga, Tenn.	Volunteer Building	*H. N. Willard*
Chicago, Ill.	2323 N. Kedzie Boulevard	*Harry Weinshank*
Columbus, Ohio	299 S. Front Street	*H. M. Bush*
Denver, Colo.	1526 Blake Street	*Mountain States Machinery Company*
Detroit, Mich.	626 Michigan Theatre Building	*E. H. Clark*
Fort Wayne, Ind.	1211 First National Bank Building	*Ed. Ball, Jr.*
Grand Rapids, Mich.	Station C, Box 13	*Geo. V. Hepburn*
Hartford, Conn.	631 New Britain Avenue	*Arthur J. Purcell*
Houston, Texas	911 Electric Building	*Dalton & Heyne*
Indianapolis, Ind.	Merchants' Bank Building	*Ross Power Equipment Company*
Kansas City, Mo.	314 W. 10th Street	*Natkin Engineering Company*
Knoxville, Tenn.	227 N. Broadway	*James A. Redmond Company*
Little Rock, Ark.	821 Southern Building	*C. O. Miller Company*
Los Angeles, Calif.	1224 S. San Pedro Street	*English & Lauer*
Milwaukee, Wis.	324 E. Wisconsin Avenue	*W. Clasman Company*
Minneapolis, Minn.	716 McKnight Building	*Kiesner Heating Specialty Company*
Pittsburgh, Pa.	841 Oliver Building	*Edwin C. Evans*
Poughkeepsie, N. Y.	50 Market Street	*Geo. W. Kenney*
Roanoke, Va.	109 1st Street, S. W.	*F. Simmons*
Rochester, N. Y.	240 Granite Building	*J. M. Carroll*
San Antonio, Texas	Smith-Young-Tower Building	*Dalton & Heyne*
San Francisco, Calif.	Sharon Building	*E. H. Goins*
St. Louis, Mo.	1222 Syndicate Trust Building	*A. K. Howell Company*
Spokane, Wash.	205 Wall Street Bank Building	*Walter B. Starky Company*
Tampa, Fla.	504 E. Lafayette Street	*Henry G. Carter*
Toledo, Ohio	1817 N. 13th Street	*Heilman-Eyster Engineering Company*
Washington, D. C.	1008 Hill Building	*F. F. Espenschied*
Yakima, Wash.	101 Yakima Avenue	*Walter B. Starky Company*

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